Chemical Week

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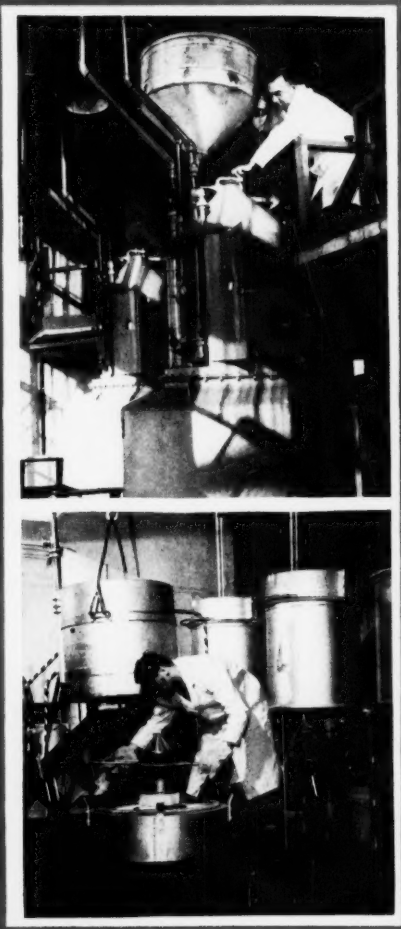

Chemical world converges on New York; foreign, domestic chemists swap news, views ..... p. 9

Synthetic crystals grow into full-fledged industry; reason: more optical instruments ..... p. 19

New peppermint oil still cuts steam and water needs; portable model speeds field tests ..... p. 23

Polyethylene containers catch on in specialties field; output this year: 100 million bottles ..... p. 29

Carbide output soars; acetylene, cyanamid derivatives spur rise ..... p. 39

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Chemical Week

Volume 69 Number 9

September 1, 1951

OPINION 2
NEWSLETTER 5
BUSINESS & INDUSTRY 9
RESEARCH 19
PRODUCTION 23
SPECIALTIES 29
BOOKS 34
MEETINGS 34
MARKETS 37
BOOKLETS 44

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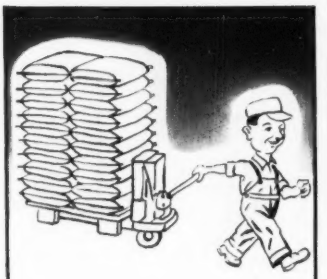

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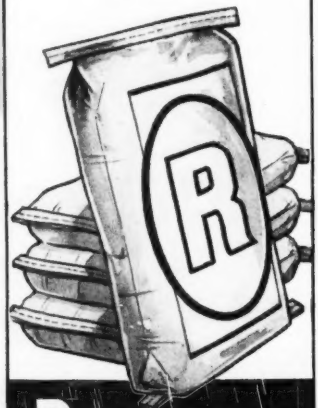

RAYMOND
MULTI-WALL PAPER
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OPINION . . . . .

Weather Eye

To THE EDITOR: . . . Better wash your mouth out with soap, CW . . . It just doesn't seem proper to me that you should run a sentence in your recent Newsletter (Aug. 11) which said . . . "Industrialists in the Pacific Northwest are cocking a weather eye at the sky . . . unless heavy rains come soon, electric power—dependent on *damned-up* rains—will have to be rationed later this year."

H. R. LEA,
Detroit, Mich.

Mouth-sudsing CW offers this theory to explain that typographical blunder: The proofreader responsible for OK'-ing that page was confused because (1) having been reared in the South he only recently learned that "dam-Yankee" is two words; (2) as a rock-bound Democrat he never managed to get the meaning of Hoover Dam completely straight.—ED.

Provocative, Periscopic

To THE EDITOR: In digging through the accumulation of periodicals resulting from a two months foreign trip, I noted with keen interest your leading article of the June 30th edition, entitled "Alkali Price Change Ahead". On the whole, I think this is a commendably provocative and "periscopic" piece and you are to be congratulated for getting so much sound information into so small a space.

I agree that gradual reduction in the manufacture of caustic by the lime process will continue, as now, to release soda ash capacity, which was cheaply built and is largely amortized. However, this is generally confined to the nine specific locations where both electrolytic and lime caustic are manufactured . . . within the fences of ammonia process soda ash plants. Many small detached caustic plants have died a natural death, and when this has happened it has given a blood transfusion to the larger lime caustic plants operated by the soda ash industry.

This feature of your article might be misunderstood because of omission of freight and traffic aspects and alkali geography in general. These and other factors will probably combine to let the largest lime process plants reach a ripe old age.

You say that the last large ash expansion was in the late 30's. I don't think this is strictly true. . . . The last three soda ash plants to be built were built just as we were emerging from the big depression of the early 30's.

These facilities (at Baton Rouge, Lake Charles, La., and Corpus Christi, Texas) were conceived with the idea that there would be radical growth which the twenty years of experience has definitely shown to have been the case. I believe that all three plants were of the order of 300 or 400 tons per day when initially put into operation . . . all of them are over 1000 tons per day now. This increase was not confined to the late 30's. Some of it took place during and after World War II.

You also say that "these are abnormal times. . . ." Maybe so. I don't think they are any more abnormal than is "peace". . . .

I am not an economist nor financier and I haven't a very broad knowledge of chemical engineering economics. However, I have been connected with the alkali industry for a long time, and I distinctly remember that the first large chlorine plants to be built by alkali manufacturers, were undertaken in order to protect the caustic market by breaking the chlorine market.

The present price structure of ash, caustic, and chlorine is the result of that condition, which prevailed in the late 20's and 30's. Chlorine, now being a glamour chemical, is as sure to see a price rise in the foreseeable future as is caustic to undergo a price drop. I'm talking of the "commodity dollar".

Z. G. DEUTSCH
Deutsch and Loonam,
Consulting Engineers,
New York, N. Y.

For a keen analysis of the past and present, a shrewd appraisal of what portends, CW's thanks to Reader Deutsch.—ED.

Complement, Not Compete

To THE EDITOR: . . . I have read your article on "Wool vs. Synthetics" (July 21) . . . Our company manufactures Vicara, which is more closely related to wool both in chemical structure and in its properties, than is any other synthetic fiber . . . We were, therefore, very much interested in the views expressed by Mr. Eric Johnston and by Mr. Harry J. Devereaux [E. S. A. Administrator and president of the American Wool Council, respectively, who held ruggedly different viewpoints in the controversy on which CW reported.] . . .

Wool and Vicara are both 100% protein fibers, the former . . . a natural animal protein and the latter . . . derived from zein, a vegetable protein found in corn. . . .

PRODUCT CONTROL THROUGH INFRARED ANALYSIS

Number 1 *of a Series of Data Sheets for Better Process Control from The Perkin-Elmer Corporation, Norwalk, Conn., Manufacturers of Infrared Spectrometers, Flame Photometers and Electro-optical Instruments.*

PROBLEM:

Specific Assay for penicillin G applicable to fermentation broths.

PLANT:

Merck & Co., Inc., Rahway, N. J.

SOLUTION:

Infrared analysis of isotope dilution. Penicillin G tagged with deuterium is added to broth sample. After qualitative isolation and decomposition, infrared analysis yields percent tracer in mixture. See equation, right.

INSTRUMENTATION:

Commercial infrared spectrometer, rock salt optics, standard liquid absorption cell with 0.2 mm spacer.

DISCUSSION:

Principle of method is that ratio of tagged to untagged penicillin remains unchanged throughout process. Method has wide applications to general problem of quantitative analysis of essential components in complex mixtures.

Other Analytical Procedures—Microbiological assay, mass spectroscopy; more tedious or difficult.

Infrared Spectrometer Analysis — Accuracy independent of amount penicillin present.
Cost: $3.50/assay Time: 2 hrs.

REFERENCES:

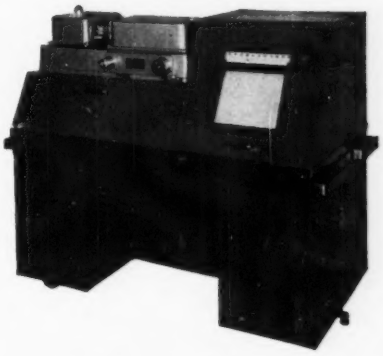
Anal. Chem., 21, 285, (1949); ibid., 23, 3, (1951); ibid., 21, 314, (1949); ibid., 23, 487, (1951)

CONCLUSIONS:

Process efficiency enhanced in Rahway, Elkton and Valley Field plants.

$$F = \frac{W_T\,(1-P_T)}{W_a\,P_T} \times 100$$

Where F = fraction isomer in sample
W_T = weight in mg. of added isotopic tracer
P_T = fraction of isomer found in the isolated sample
W_a = weight in mg. of sample containing W_T mg. of tracer



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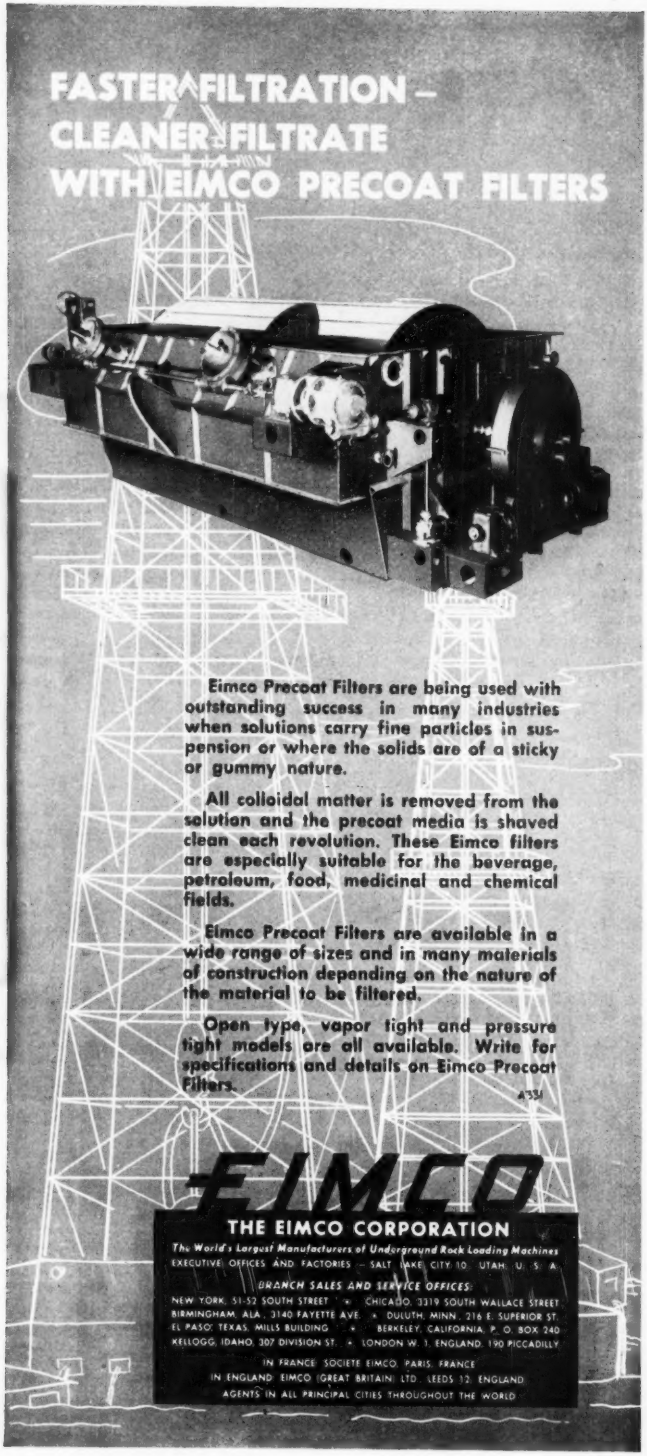
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OPINION . . . . . .

In addition, however, each fiber possesses characteristics all its own; . . . it is the combination of properties that makes each an outstanding fiber in its own right. When properly employed, wool and Vicara do not compete, and when they are blended together, each fiber complements the other to create fabrics with features that cannot be achieved with either alone. . . .

It is probably inevitable that in some instances these fabrics will invade the realm of "all wool" but on the other hand, we are equally sure that blends of wool and Vicara, because of the low price and steady availability of Vicara, will permit the use of wool in many fields where it has heretofore been priced out of the market.

In fact, the principal function of Vicara in a blend with wool is to "upgrade" the wool. For example, a fabric that is normally made of lower priced, coarser wools can be given the quality and luxury features of high-priced wools, and at an even lower price, by blending . . . Thus, the competitive position of wool is greatly improved . . . its field of usage is extended.

Naturally, our comments . . . are written from the viewpoint of Vicara, but basically we feel the same way about all of the synthetic fibers. That is, that all fibers, natural or synthetic, possess properties or combinations of properties peculiar to each, and that a well-designed fabric utilizes one or more fibers, depending on the use for which the fabric is intended.

Wool is an outstanding fiber in many respects, and has nothing to fear from the synthetics. Its future use, however, will be more and more in blends, and less under the old familiar "100%" label.

May I compliment you on the very thorough manner in which you reported and commented on the present controversy . . .

JESSE F. YEATES, JR.
Sales Manager
Virginia-Carolina Chemical Corp.
Richmond, Va.

Thank you, Reader Yeates for a cool and candid appraisal of a hotly-debated controversy, a keen analysis of the outlook.—ED.

CW welcomes expressions of opinion from readers. The only requirements: that they be pertinent, as brief as possible.

Address all correspondence to: The Editor, Chemical Week, 330 W. 42nd St., New York 18, N. Y.

NEWSLETTER

Official figures now show that catalytic cracking has outstripped thermal cracking in the race to provide gasoline—and it's forging farther and farther ahead as new refinery units are constructed.

This spells booming business for the chemical firms supplying catalysts for the growing number of crackers.

The new emphasis on benzene from petroleum is also filling their pockets: Such benzene-yielding processes as reforming, hydroforming, Platforming and Houdriforming all require catalysts.

Latest refinery expansion to be revealed is a $10 million Sun Oil Co. project at Sarnia, Ont. Construction of the 10,000-15,000 barrels-per-day unit will start next spring.

Sulfur and soda ash are also in the Canadian spotlight:

Royalite Oil Co. will build a $350,000 sulfur recovery plant near Calgary, Alberta, to extract 30 tons a day from Turner Valley's natural gas. Construction will start this month, be completed by April.

Discovery of a large salt deposit adjacent to a limestome bed at Antigonish, Nova Scotia, points to the establishment of a soda ash plant there. Coal can be obtained from Cape Breton or Pictou.

Negotiations are now under way with unnamed companies. Minimum efficient size is reported to be a 200 tons-per-day plant, requiring investment of about $6 million. Key to current interest: aluminum.

A significant addition to cellophane capacity was realized this week as Olin Industries' new plant (Pisgah Forest, N. C.) went into substantial production.

Current stringency of carbon bisulfide supplies will force output of the new plant into defense and defense-supporting uses.

Carbon black, white pigments and magnesium occupied NPA's attention last week as industry advisory committees bared their troubles.

Shortage of hopper cars is slowing shipments of carbon black. Additional cars won't be available until next summer, and in the meantime methods must be adopted to utilize present rolling stock efficiently.

There is generally enough black—with the exception of SRF and thermal grades. The pinch will be off next year when output rises from the current 1,691 million pounds to 2,215 million.

Getting enough lead is the major pigment problem. The industry committee urged steps to increase imports. Zinc and titanium dioxide are easy, but the industry is concerned about the effect of fourth-quarter DO orders. Also higher pigment demand is foreseen.

Magnesium producers will likely be subject to an order that would earmark a specific maximum percentage of monthly output for defense.

A new twist in water fluoridation: The Louisville (Ky.) Water Co. started adding fluorides to the municipal water August 1, but the good citizens didn't learn about it until August 17. Reason: to see if users noticed any difference. There wasn't a single complaint.

The lid is off. Glidden Co. reveals that its top-secret product (CW Newsletter, Aug. 18) is cortisone. The firm's Soya Products Division has been researching four years, is now making the material commercially from animal bile acids after a year's experimental production.

Glidden researchers claim the best process to date for some of the steps involved in the synthesis.

First objective will be to increase total supply—and so for the time being bile will serve as raw material. But look for a synthesis soon from soya sterols. Vice-president P. E. Sprague predicts commercial production from that source.

Present output is not suitable for direct clinical use. It is sold to pharmaceutical houses for further processing and packaging.

Titanium is another product that is moving ahead rapidly.

Du Pont will build a 10-ton-a-day plant near Wilmington, negotiations for which are nearing final stages. The plant will be built under a certificate of necessity, and under a procurement contract which insures sale of the product.

Such a provision means that the Government will buy the metal if it can't be sold elsewhere; but under today's circumstances there's little chance of this. Most if not all of the titanium will go to Government contractors for defense production needs. Little if any will find its way into civilian channels.

National Distillers Chemical Corp. will sell a sizable chunk of its chlorine output — by-product of metallic sodium manufacture — to its jointly-owned (with Panhandle Eastern Pipe Line Co.) subsidiary, National Petro-Chemicals Corp., which was formed last June.

National Petro-Chemicals will process about 400 million cu. ft. of natural gas a day, separate it into various fractions and produce ethyl alcohol, ethyl chloride and other products from ethane. National Distillers will furnish the chlorine under long-term contract.

The petrochemical subsidiary already has ten-year sales contracts in its pocket for the propane and natural gasoline it recovers. It also has five-year sales contracts for half of its ethanol and all of its ethyl chloride output. Total cost of facilities: about $34 million.

National Distillers is now floating a $50 million preferred stock issue to raise capital for its 60% share of the subsidiary and for other purposes.

The cottonseed oil industry is shifting its center of gravity. Pointing up the trend is Western Cotton Oil Co.'s $5¼ million expansion program in California, Arizona and Mexico.

The program calls for 27 new cotton gins and two cotton oil solvent plants, one in Phoenix, Ariz., one in Bakersfield, Calif. Each will have a 400 ton daily capacity.

Here's a novel twist on stream pollution. Anglers usually complain that chemical wastes kill off the fish and thus deprive them of their sport. But the fish in "polluted" Shenandoah River are bigger and gamier than ever. Reason: Dumped waste from Merck's Elkton (Va.) plant contains growth vitamin B_{12}—and the fishermen love it.

. . . The Editors

What 50 productive years have meant to your industry

This year, we at American Can Company are observing our 50th anniversary.

Offhand, you wouldn't think our anniversary would be very important except to the 33,000 people who work for Canco. But may we remind you that this anniversary celebrates 50 productive years that have helped your industry grow and prosper?

During this half century, Canco's growth and co-operation with your industry have brought forth widespread process and product improvement—opening *new* markets and helping you sell in *all* markets more efficiently than ever before.

A good case in point is this Canco container. It is widely used for liquid polishes, insecticides, liquid detergents, oils, and other liquids where positive reclosure is essential.

The people of Canco are proud of this and the many other Canco contributions to this industry.

And it is our pledge for the years ahead that the inventiveness and ingenuity so characteristic of Canco will continue to explore and open up new areas of usefulness to your industry and to the consumers it serves.

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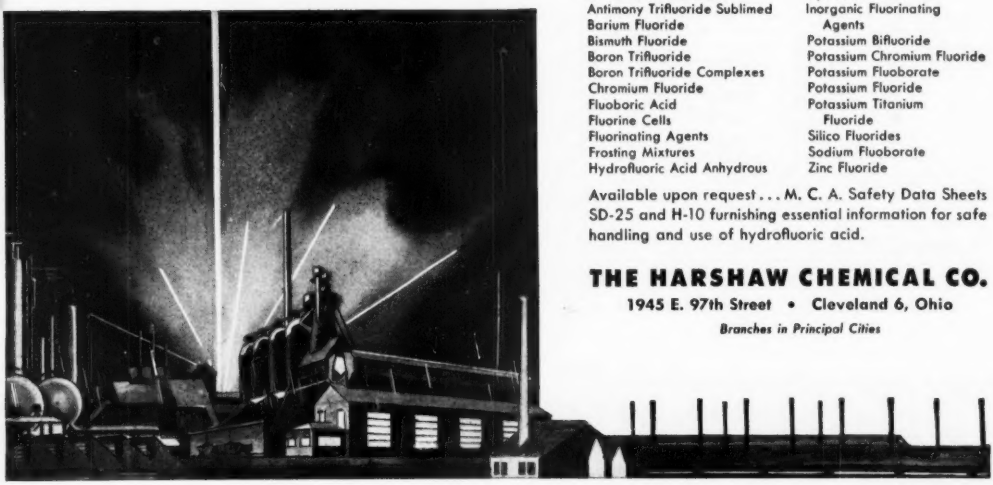

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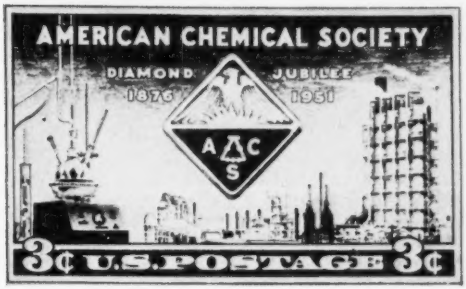


STAMP OF APPROVAL: Special issue of U.S. postage stamps will herald ACS Diamond Jubilee; put reminder of chemistry's growing role in laymen's mailboxes.

PARSONS: Broadway's lights, Fifth Avenue's windows and a nation's recognition testify to the soundness of his planning.

At the Three-Quarter Mark

World Chemical Conclave next week adds luster to American Chemical Society's Diamond Jubilee.

Chemists of 43 nations will join 15,000 of their American colleagues to make progress report to the world.

Custer was fighting Indians and Bell was inventing the telephone when, in 1876, thirty-five (mostly bearded) chemists gathered in a lecture room of New York University and founded the American Chemical Society. This week, seventy-five years later, in an era of quiet Indians and millions of noisy telephones, 66,000 members of the much-grown American Chemical Society will celebrate the Diamond Jubilee of their organization.

Over 15,000 members of the Society are expected to make the pilgrimage to New York to take part in the lavish week-long program of social and technical events that will mark the birthday.

World Chemical Conclave: The ACS meeting in New York is the first half of a two-week World Chemical Conclave that will be extended to Washington D.C. next week. Second half of the Conclave will consist of the Sixteenth Conference of the International Union of Pure and Applied Chemistry and the Twelfth International Congress of Pure and Applied Chemistry. Technical sessions of these latter groups are to take place in New York but most of the foreign chemists will join their American colleagues in a visit to the nation's capital to celebrate the fiftieth anniversary of the founding of the U.S. Bureau of Standards.

No Ivory Towers: There seems little doubt but that the Conclave will live up to its advance billing as the "greatest gathering of chemists and chemical engineers ever held on this planet." But it will be much more than a rallying of the men (and women) who master molecules and annihilate atoms. In a strong sense, it is a demonstration for the benefit of the lay public of the practical everyday role of chemistry in modern living.

Many Facets: To get over modern chemistry's message to the public, the ACS has received the cooperation of many major chemical companies, universities, the Government, and radio and television stations, newspapers, magazines and several non-chemical groups and companies. Department stores all over the nation, for instance, will fill their windows during this National Chemistry Week with displays featuring the role of chemistry in consumer goods, while radio and television speakers and screens explain the application of chemical technology to problems of public health and national defense.

Eastman Kodak's exhibit in New York's Grand Central Station, featurturing the largest color transparency in the world (18′ x 60′) will team up with a Du Pont exhibit in Pennsylvania Terminal and a Monsanto display in New York's Baltimore & Ohio Railroad terminal to welcome visiting chemists and educate wandering New Yorkers on the wonders of chemical science. And high above Gotham's famed Times Square, Union Carbide and Carbon's advertising panels will flash out more to the lay public on the facts of life in a chemical century.

Man & Dream: Though millions of laymen and thousands of chemists will witness all this splendor, one man will feel a bigger glow of accomplishment than the rest. Charlie Parsons, the hard-headed (and -fisted) New Englander, who as Secretary steered, pushed and pulled the American Chemical Society through thirty-nine of its toughest years, deserves that extra glow. Mister Chemistry worked for it.

QUIET: Amid tall trees, no hum of pumps and motors.

CLUB WHITESANDS: Relaxation for chemical workers.

Operation Relaxation

Vacation-bound members of the International Chemical Workers Union, AFL, are heading toward the Kawarthas Lakes District of Ontario, Canada this vacation season. Goal: Club Whitesands on Lake Catchacoma, the union's newly acquired recreation center for its vacationing constituents.

The idea of a union buying and maintaining a resort for its members is not new to the labor movement. But the purchase of Whitesands marks the first time that a chemical union has developed an interest in country club proprietorship.

Nothing Spared: Officers and members of ICWU are justly proud of their organization's new spread. It is a deluxe resort property erected only four years ago at a cost of over one-half million dollars. Among its facilities are a main lodge housing two lounging rooms, cocktail bar, gift shop, card room, guests' dining room, a large kitchen and managerial offices.

Also on the grounds are a staff house with accommodations for 24 employees and 10 modern cottages capable of housing 70 guests at reasonable rates. All units have private baths and telephone service. The club also has its own power station and pumping plant.

Easy Access: At present, Whitesands is also open to the general public. But eventually it will be solely for the use of ICWU members and their families. Its location is admirable, say the union officers, because it is well situated with respect to chemical plants in Buffalo, N.Y., and the Middle West.

Final Touch: In addition to other facilities, the union resort has an extensive fleet of powerboats, skiffs and canoes to add to the enjoyment of the vacationers. But perhaps the most unique part of its facilities is the recreation hall maintained for the use of Whitesands' own employees . . . a resort within a resort.

Legal Kite For Wages

Much to the surprise of the "hold-the-line" school of thought, the wage Stabilization Board—with public, industry and labor members agreeing—has hit upon a sliding-scale approach to wage controls. It has adopted the principle that any fluctuations in living costs should be compensated through adjustments in pay.

The new attitude of the WSB which may have a significant impact on future labor negotiations in the chemical industry, approves of percentage wage adjustments to keep up with percentage changes in the government's cost-of-living index since January 15 of this year. This philosophy will apply whether or not employers resort to wage escalator clauses. But where no escalators are used, living cost adjustments may be made every six months.

Added Increases: In addition to cost-of-living boosts since last January 15, employers may also grant increases up to 10 per cent above January 15, 1950, if they have not already done so. In other words, the permissible limit for general wage increases is 10 per cent of January 15, 1950 wages plus cost-of-living adjustment since January, 1951.

New Negotiations: It's a safe bet that the new attitude on the part of the WSB will cause many unions to bring pressure to bear on employers to reopen contracts prematurely to take advantage of cost-of-living allowances, if they have not had an increase in the last six months. And it's an equally good guess that "fringe" benefits outside the limits of WSB rulings will also come in for a good share of the conversations at these labor-management confabs.

Chemicals Picture: Actually, a good share of the chemical companies will not have too much to fear by the change in heart of the WSB. The Bureau of Labor Statistics of the U.S. Department of Labor received 106 wage contracts from the chemical industry in the first half of this year. Half of them gave hourly wage increases up to seven cents, and others gave more. The most common hike was four cents, granted by one-fourth of the employers.

The Bureau's figures reveal that smaller companies tended to give larger increases. One chemical company employing 250 gave 20 cents.

Many of the large companies, on the other hand, tended to increase the values of the fringe benefits. Thirty-two of the wage agreements reported by the Bureau covered companies employing 1,000 or more workers. Of these contracts about 75 per cent gave wage increases of 7 cents or less. This leaves little doubt that the "fringe" benefit has now become part of the whole cloth of labor negotiations in the chemical industry.

NPA Lab Assist

Out of the reams of orders initiating from NPA, the chemical industry can find encouragement from an amendment to M-71. It liberalizes provisions for getting priority assistance on laboratory materials.

M-71 is the basic order permitting laboratories to get small quantities of controlled materials and other products through self-certification of the need. Unamended, it required companies operating more than one lab to group them all together, to treat them as a single unit.

This worked a hardship on many firms, particularly in the chemical field where a single company usually

operates several labs—each with a different function. And it's a common practice to keep a separate set of books on each.

The recent amendment provides companies in that situation with a choice: They can treat them individually or lump them together. It will not be the whole answer to a company's bookkeeping problem on getting needed equipment and materials for its laboratories, but it's a step.

More Wage Creep

More than half of the nation's paint and varnish workers increased their earnings from 5 to 10 per cent in the business year ending last May. This fact was made known this week in a report released by the Bureau of Labor Statistics of the U.S. Department of Labor.

For a little less than a third of the workers in the paint and varnish industry, earnings increased more than 10 per cent. For the rest, the rise was less than 5 per cent. The report was based on a study of wages paid in 12 large industrial areas.

Lowest-paid men, according to the study, were hand truckers in Louisville, Ky., who earned an average of $1.15 per hour. Highest-paid were Los Angeles technicians, who drew down about $1.96 an hour. Two-thirds of the industry's payroll hit an average of $1.50.

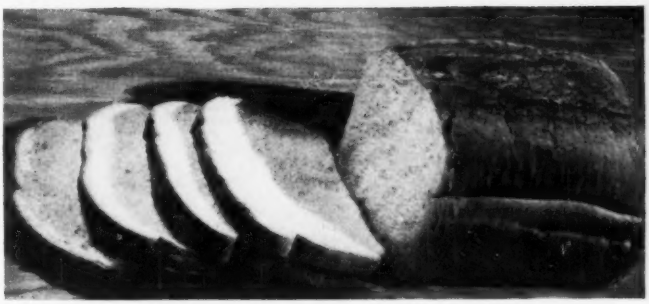
Distaff Side: Comparison of wages for men and women labelers and packers shows that women workers receive less than men in each of the industrial areas studied. The range for women was from $1.05 to $1.50 per hour, while the men received from $1.19 to $1.68.

Another Round

Taking potshots at chemicals in foods may become a favorite Washington pastime. Latest to align itself on the side of the Delaney Committee is the subcommittee of the Senate Agriculture Committee. Its target: chemicals in bread.

The subcommittee was formed in 1949 to investigate production and utilization of farm crops. Among other things, it was "directed and authorized to prevent as far as possible the adverse impact of recurrent surpluses of farm production on our agricultural economy and on other segments of the Nation's economic structure."

In its investigations, the subcommittee uncovered the fact that, in the last twenty years, per capita consumption of bread has dwindled from 173 lbs. to 140 lbs. It side-steps the obvious reason, instead chooses a more devious one: chemicals.



BREAD: Richer people eat less—a fact Congressmen ignore.

Without actually taking a stand, the subcommittee says, in its Final Report, "There are those who believe that the decline in consumption of bread is due to the fact . . . that present-day bread contains less skim milk, nonfat milk solids and fats . . . that chemicals and compounds . . . while adding no nutritional value are widely used to impart properties of softness and sales appeal . . . that flour millers not only bleach flour but also remove the natural minerals and vitamins from wheat and often add synthetic chemicals."

The report then gives a five-page, desultory account of various aspects of the use of chemicals in food, threading throughout a case against their use. It ends the section with five recommendations, two of which carry significance for producers of food additives:

- That the Food, Drug, and Cosmetic Act be amended to provide that non-nutritive ingredients shall not be added to bread or other food products unless their addition shall serve some useful purpose to the consumer and they have been first certified by the Food and Drug Administration to be noninjurious.
- That a committee of the Congress make a thorough investigation of the Food, Drug, and Cosmetic Act, and all operations under this act, with a view to strengthening either the law or its administration for the greater protection of the consuming public in the matter of the wholesomeness and purity of processed food, including bread.

Not So: The subcommittee missed completely one of the prime factors in the decline of bread consumption. It's one of the economic facts of life that as real income increases, people spend a larger portion of it for more expensive meats and proteins, for milk, fruits and vegetables. In short, richer people eat less bread.

Furthermore, the subcommittee's discussion of chemicals in foods adds nothing to an already muddled situation. And, in its recommendations, it is advocating laws that would be impossible to administer with any degree of equity, would stifle valuable research, and are incompatible with the American standards of judicial review *(CW, July 14)*.

One consolation for producers of food additives is that the committee's batting average in the past has been anything but impressive; it urged legislation by the 81st Congress on eleven items, received action on two.

Meanwhile, the industry must wait and wonder who will be next to take up the cudgel against food chemicals. Maybe, like honoring motherhood and damning sin, it will prove a sure-fire method of getting votes. If so, the industry can look forward to similar, short-sighted attacks in the future.

Nobody Loses

RFC's synthetic rubber program is helping flood-stricken grain growers in the Missouri-Kansas area—and at no extra cost to anybody.

RFC Administrator W. Stuart Symington revealed during Senate testimony last week that RFC has told alcohol distillers it would consider purchase of alcohol made from water-soaked grain at 70 cents per gallon—about 15 cents under the market.

Between 3 and 4 million bushels of grain were damaged by the flood, enough to make between 8 and 10 million gallons of alcohol. Under the RFC's proposal, the distillers could pay $1 per bushel for the grain, saving money for themselves and helping out the grainmen who were selling the wheat for a distress price of 15 cents per bushel. On the 8 million-gallon figure, RFC will save better than $1 million in alcohol costs.

Selling Brokers to Sell Stock

UNDER SPONSORSHIP of the San Francisco Stock Exchange, 65 local brokers visited Rheem Manufacturing Co., Richmond, Calif. Trip was designed to give first-hand knowledge on company whose securities brokers handle. Here C. V. Coons, Rheem director and veep in charge of sales (with badge) explains how displayed drums are made by Rheemcote process (CW, June 2). Ronald Kaehler, SF Stock Exchange president, at Coons' right, listens with security dealers. Increased public interest in expansion financing—always a problem in the chemical industry—is hoped-for result of plant visit.

Building for Survival

President Truman has taken matters into his own hands in the Government's drive to encourage industry to disperse. The action came last week when presidential OK was given to an industrial dispersion policy drawn up by the National Security Resources Board.

Industry and the Government have been trying to get together on a plan for some time (*CW, Aug. 18*), but all efforts to get Congressional approval have failed, and the President's action is the first major official step.

Congressional leaders are not too happy over this "by-pass." Termed a "flagrant defiance of Congress" under a "one-man Government" by Republican Leader Joseph Martin (Mass.), the plan is raising considerable protest from representatives of non-dispersed areas.

The plan is designed to encourage new plants to locate just outside highly congested areas by offering Government incentives. Incentives include certificates of necessity for accelerated tax amortization; allocation of critical materials for construction purposes; defense loans; and defense contracts. At present the first inducement is under a 60-day moratorium order from Defense Mobilization Director Charles Wilson, to allow time to study the workings of the present amortization plan.

No Favoritism: According to the NSRB plan, no section of the country would be favored at the expense of another. Established industries will not be moved, and voluntary relocation will not be discouraged. However, if an industry builds a plant that fails to live up to NSRB's dispersal suggestions, it would have to justify the location to get preference in critical materials, or defense contracts or loans.

The distance from highly congested industrial areas need not be great—10 to 20 miles will do, and even smaller distances are effective if natural protections, such as hills, exist.

Essentially the Government sees these minimum requirements for successful dispersion: limited size of installations; not too close together even outside present congested areas; service by more than one transportation facility; and location on power and other utility grids.

At present the plan calls for local groups to draw up their own plans voluntarily. In this way local industries, with knowledge of local conditions, will be in position to do the job the best.

A "pilot operation" conducted in Seattle, Wash., by representatives of industry, labor, and local government, has resulted in a Government pamphlet, "Is Your Plant a Target?" which the Government hopes will give industry help in getting started on the job of building for survival.

Coffee-Time Bonus

A new defoamer based on coconut oil fatty acid reduces considerably the bubble lifetime of synthetic rubber latex water-emulsion paints. Developed at the Stanford Research Institute, it is being market-surveyed by producer El Dorado Oil Works, has other potential uses.

The new product and a plasticizer developed at the same time are "coffee-time dividends" earned by SRI and the Oakland, Calif., company. Working under an El Dorado contract, SRI had been searching for almost 2½ years for a suitable commercial plasticizer using El Dorado's coconut oil fatty acid as a base. Equally fruitless was a paint company-supported project seeking an improved commercial defoamer. Success for both ventures was achieved one day while researchers discussed mutual problems over coffee.

Taking one of the unsuccessful plasticizers, the defoamer people tested it for defoaming possibilities. It proved to have the desired properties, appeared nine months later as Defoamer ED. Among its more enticing properties is the remarkably short bubble lifetime displayed by water-emulsion paints of the synthetic rubber latex variety when Defoamer ED is added.

In comparative tests, competitive defoamers in concentrations of 0.5% gave bubble lifetimes of at least 105 seconds, while Defoamer ED in concentrations of only 0.3% by volume reduced bubble lifetime to less than 1 second. This property is particularly desirable when unskilled consumers apply paint with a roller. Paint with no defoamer added at all displayed bubble lifetimes greater than 600 seconds in SRI tests.

Ready-Made Buyer: The paint company, not wishing to spread itself too thin, relinquished its share of rights in Defoamer ED, and El Dorado is now conducting a market survey on it. The paint company is its biggest customer to date. At the present rate of production, sale price of the new defoamer on a pound-for-pound basis is somewhat higher than competing brands; but the smaller quantity needed coupled with greater demand will bring the defoamer price per gallon

of paint down below present defoamer levels, El Dorado believes.

Defoamer ED has passed penicillin toxicity tests and may be adopted by pharmaceutical houses for use during the aeration step in the manufacture of penicillin. Other possible uses being tested are in the manufacture and application of adhesives and in textile processing.

El Dorado also has the plasticizer it was seeking in the first place. Still in the testing stage, however, it has not yet been accepted by industry. Expected to market at comparable cost, it is claimed to have a lower brittle point and much lower volatility than DOP, currently the most widely used plasticizer.

Self-Scoured Wool

Suint, a component of wool grease, and n-butyl alcohol are used to scour wool in a new process developed at the Western Regional Research Laboratory. With the basic patent applied for, WRRL recently opened the process to all comers, and several companies are interested.

Developed under the direction of Harold P. Lundgren, the basic idea of the process is to utilize the inherent scouring action of suint, a mixture of water-soluble components of wool grease. These are analogous to soaps, since they contain potassium salts of organic acids. And the basic cleaning process is the same whether suint or conventional scouring compounds—composed primarily of soda ash and detergents, either synthetic or soap—are used.

It was found that the scouring action of suint can be improved and made more reliable by addition of alcohol, and the effect of the alcohol can be accentuated by a controlled amount of salt (0.1 to 0.2 normal). When grease wool samples are scoured under standard conditions in water-alcohol mixtures of increasing concentration, the amount of residual grease first decreases to a minimum of about 0.5-1%, then increases, and finally, if the alcohol is soluble enough, again decreases. Approximately 0.5% residual grease is desired for processing characteristics.

With ordinary ethyl alcohol, 20% concentration leaves the least residual grease. Smaller amounts of higher alcohols are increasingly effective. Normal butyl alcohol has been chosen for the process since its boiling point is above the melting point of the grease and below the temperature where felting becomes significant. Relative availability and costs have also been taken into account. A 3% solution used at 60 C. is the optimum concentration. Further addition of alcohol to about 7%, saturating the water, causes the emulsion to break and the grease and dirt to separate. The alcohol concentration can then be readjusted and the solution used again. If the grease wool is very low in suint, it may be necessary to prime the scouring liquid with suint or soap, or to rescour the first lot. The concentration of suint tends to build up and must be removed from time to time to prevent off-color in the wool. The wool is finally rinsed with water after scouring.

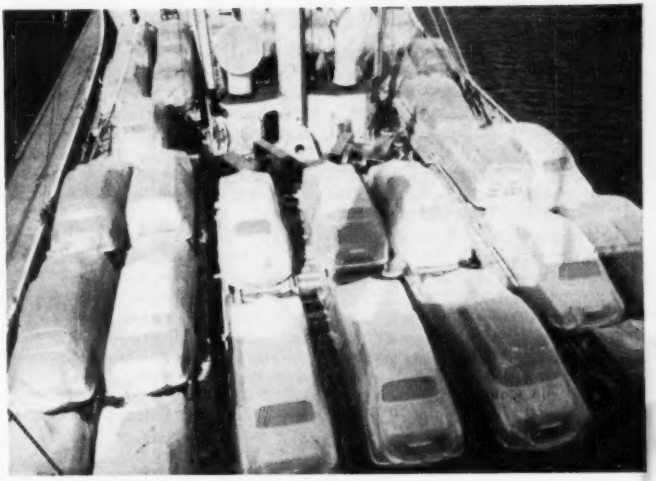
Lab Model Only: These principles have been applied in a laboratory model continuous counter-current wool scouring apparatus that precipitates the grease and dirt, readjusts the alcohol concentration by distillation, and recycles the scouring liquid.

Advantages of the process:

- It is carried out under neutral conditions, reducing felting and resulting fiber damage that is common with soap-soda methods.
- Recoveries of grease and suint are made separately and easily.
- The solvent is relatively nontoxic and non-volatile; it is recycled, but does not need to be completely redistilled for each cycle. There is no pollution control or waste disposal problem.
- It requires relatively little floor space; present scouring equipment may be adapted to its use.
- The alcohol inhibits putrefaction.
- The process is estimated to be cheaper than solvent scouring.

Among its disadvantages are the extreme detrimental effects of water hardness on residual grease content (100 parts per million of calcium may raise the residual grease content to 2%), and the relatively high initial cost. It is expected that these difficulties can be overcome.

While companies concerned in wool scouring would welcome any process that will eliminate the shortcomings of present scouring methods, and are definitely interested in the process, they would like to see data on work done under commercial conditions before passing judgment on the process. The cost of chemicals currently used for this purpose is relatively low, and if a more expensive chemical such as normal butyl alcohol is to be used, recovery rates will have to be high. WRRL feels that pilot plant work is desirable; out of that may come a truer measure of the process's soundness under use conditions.



Safe From the Sea

VINYL CHLORIDE now protects U. S. automobiles bound for overseas destinations from the corrosive action of salt spray. (Austins have been similarly protected during shipment from England.) Domestic pioneer of this technique is Pacific Transport Lines (San Francisco). Vinyl film was first used, but proved too easily damaged. Polyethylene film served as a stop-gap until a vinyl-impregnated canvas was developed. Cost per car: $40 to $80, depending on weight of cloth.

Cutting Loose from China

Despite the continuing "maybe, maybe not" nature of our relations with China, L. O. Crosby, Jr., president of Crosby Forest Products Co., largest single producer of domestic tung oil, isn't visibly worried. Reason: While China still produces the lion's share of the world's tung oil, the domestic industry (CIW, Feb. 3) is here to stay.

The now established home-grown industry is the result of pioneering some 20 years ago by such entrepreneurs as L. O. Crosby, Sr.

At that time the elder Crosby was running a successful lumber company in Mississippi. Seeking ways to utilize his cut-over timber land, Crosby, Sr. followed the general practice of producing naval stores from his pine stumps, which resulted in the Crosby Chemical Co. But he was still unsatisfied and decided to gamble on the then-experimental tung tree orchards. This risky venture gave birth to the present Crosby Forest Products Co.

Chinese Control: At that time domestic paint manufacturers who wanted to utilize the special drying properties of tung oil were completely dependent on the hazards of Chinese imports. Irregularity of shipment, wide fluctuations in price, and variations in quality are characteristic of the Chinese industry, where production is burdened by crude methods and poor transportation.

Initial domestic steps were confined largely to experimental orchards in Florida. Crosby, Sr.'s efforts have been a major factor in building tung oil production into an important industry; his own state, Mississippi, is now the largest producer of tung oil. The industry* has helped diversify Southern agriculture, and has put blood in the veins of Southern economy. But most important to paint producers is the possibility of becoming completely free of the Chinese industry.

Since the death of the elder Crosby, L. O. Crosby, Jr. has guided the company through a rapid growth, until today it produces a third of the total domestic tung oil. From its own 5,000 acres, and the 35,000 acres it manages, the company expresses 1,200 gals. of the oil a day in its mill. At present the company is expanding its own orchards at the rate of 500 trees per year, and plans to have 10,000 acres in the future.

Side Lines: Not satisfied with growing his own trees, the younger Crosby has his company performing an agricultural-management service, providing complete care for tung orchards. For the service the owner is charged cost, plus a fee. Real return for this service comes when the owner sends his tung nuts to the Crosby mill. He can sell elsewhere, but most owners go to Crosby, and that boosts business.

It was Crosby who initiated the rapidly spreading policy of grazing beef cattle on the portions of orchard land unsuitable to the highly exacting tung trees. This side line has brought such a good return that Crosby plans to add sheep to his enterprises this year.

* Which now harvests over 10 million trees in Florida, Mississippi, Alabama, Louisiana, Georgia and Eastern Texas.

L. O. CROSBY, JR. (right): Oil and beef now, sheep next.

By-Product Headache: A chronic headache to Crosby, and other tung oil producers, is the lack of profitable by-products in the industry. At present the only by-product is the residue press cake. Since this cake contains toxic elements it must be sold as citrus fertilizer at half the price it would command as stock feed.

The problem is now being studied by the company. While some work has been done on the possibility of plastics derived from tung production, most present work is in investigating methods for removing the toxic elements from the press cake. It is incidentally thought by Crosby that these toxic elements may be useful as insecticides.

The many problems besetting the tung oil industry cry for solution; but meanwhile the company is increasing production to bring the paint industry long-awaited relief from undependable imports.

Neoprened Paper

Du Pont salesmen have begun to beat on the paper industry's doors in search of customers for a new neoprene latex additive. The additive makes possible the manufacture of specialty papers with high wet strength and good chemical resistivity.

While the addition of rubber to paper is not new, the Du Pont development is the first commercial process allowing addition of only a small percentage of latex and adding it without changing regular papermaking procedure. Even Du Pont's development isn't new, but only now has it been added to the salesman's kit.

The latex is a modification of the company's usual neoprene latex. The change eliminates need for extra processing steps, giving better and less expensive specialty papers.

Present small-scale industrial uses—primarily in Du Pont plants—are industrial filter paper to replace cotton duck, barrel covers with elastic edging, and tray liners. Only present retail use is as a backing for wall tile. If this item goes into volume production, the neoprene paper would replace present asphalt-impregnated stock.

Some other uses now being evaluated: gasket paper, multiwall bags and packaging uses in general, sandpaper base, linoleum backing and in laminates.

Du Pont itself will not make the new papers. It will sell the latex to paper companies and supply techni-

LATEX PAPER: From flooring to containers.

cal assistance through its new Deepwater Point, N.J., paper laboratory.

Paper Properties: Wet strength is the primary advantage of the neoprene paper. Tensile strength, elongation and bursting strength are increased slightly when dry, appreciably when wet.

The elasticity of the paper is also increased, though this is a secondary advantage. A filled bag dropped on the floor would be less likely to break if made of the neoprene paper. Other secondary properties include better folding endurance and scuff resistance.

The addition process differs from previous commercially developed methods of adding rubber to paper. The latex is added to the cellulose while still in the beater or headbox and before the fiber is picked up on the wire screen to become paper sheet. Curing of the rubber uses only the regular drying rolls of the paper making machine, and does not require additional rolls or other facilities.

Natural rubber or GR-S have been added to paper, but this has been accomplished by saturating the paper with latex. Special equipment is needed, and it is impossible to add only a small amount of the elastomer.

If papermakers want to compete, they can add a large percentage of neoprene and get papers similar to those produced with other rubbers. At present, though, papers containing small percentages of neoprene will compete mainly with resin papers—such as those containing melamine. Each of these types, however, has its own specific advantages.

Paper Future: While it is still too early to tell, Du Pont representatives have opined that packaging uses for the new paper will pay for most of the development costs.

The latex for the new process will come from the company's Louisville plant, which has been undergoing a sizable expansion program *(CI, Oct. 1950)*.

Acres of Rejects

Demands for service from an increasing number of manufacturers hearing of a new process for removing porcelain enamel (CW, March 10), have forced a fourfold expansion of capacity by New Process D-Enameling Corp. Monthly chemical requirements of the larger operation will run about 9,000 gal. of liquid caustic and 5,000 lbs. of sodium silicofluoride.

Over 100 carloads of rejects has been shipped to its new plant in Aurora, Ill., to await reprocessing. Piled high in the yard, they represent a savings of 1,200 tons of steel and a retail sales value of $250,000. The three-shift operation will process about 80 tons per day for return to the original manufacturer. Rejects which were a total loss two years ago are now salable. Potential savings in just one industry and one plant are estimated at 75,000 tons.

Appliance manufacturers say that the service fills a definite need in their manufacturing picture and will continue to do so even in normal times. Aside from the consideration of saving critically short steel, the process salvages fabrication, labor and overhead costs to the extent that salvaging costs are less the original manufacturing costs. A $13 tub, for example, can be shipped out, processed and returned for about $6. One stove manufacturer was able to re-enamel 6,020 out of 6,200 stove tops—a 97% conversion to salable condition.

Volume is the only answer to economical operation. Most manufacturers couldn't afford to operate their own salvage service, but are able to take advantage of this centralized service.

The new plant has a bank of five 4,500 gal. stripping tanks, gas-heated to 300 F. A 3-ton crane lowers the 6'x17' buckets into a caustic-silicofluoride solution and removes it after three hours. Parts are then rinsed in another tank, spray rinsed, and dried in a forced draft air-dryer utilizing exhaust heat from the solution tank gas burners. Conveyors carry the parts through three sandblasting booths and out to the loading dock for return shipment.

Quinoline By-Passed

A new process may change the face of niacin manufacture. Based on a dialkyl pyridine, the method will do away with dependence on a temperamental quinoline supply.

Starting material for the process is 2-methyl-5-ethyl pyridine. Made from acetaldehyde and ammonia by condensation, it should look good to producers of niacin. Niacin (nicotinic acid), a member of the vitamin B complex, is currently made by oxidizing quinoline. The process works fine, but quinoline supply is getting tighter by the day. As might be expected in these times, niacin demand is on the upgrade.

PRESIDENT A. M. LANDER (left): Chemicals "extract" profits from scrap heaps.

Quinoline is not the only key to niacin manufacture. At one time or another the vitamin has been made from pyridine, nicotine, trigonelline, and β-picoline. But all of these substances have fallen by the wayside; key: process economics. In a normal market, more than half the total quinoline output goes into niacin production. However, new defense uses for the coal-tar heterocyclic have caused a considerable shift in the balance. Truth of the matter is that the quinoline supply today is a definite limiting factor on niacin production.

But this darkening situation may well be reversed with the commercial debut of 2-methyl-5-ethyl pyridine. Supply of the compound is assured. Carbide and Carbon Chemicals Division has had it in pilot-plant at Institute, W. Va., for more than a year. A multi-million pounds-a-year plant should be in by December of this year. Phillips Chemical Co. will soon be turning out substantial amounts of alkyl pyridines* by essentially the same acetaldehyde-ammonia condensation process.

Easy to Make: A good deal of spade work for the new niacin process was done by Du Pont researchers and is now covered by U.S. Patent 2,524,957 for the manufacture of iso-cinchomeronic acid. According to Du Pont, a 2,5-dialkyl pyridine—2-methyl-5-ethyl pyridine in this case—is oxidized (at an elevated temperature and pressure) to 2,5-pyridine dicarboxylic acid (iso-cinchomeronic). This product is then readily decarboxylated in the 5—or alpha—position to yield the monocarboxylic niacin.

Merck & Co. and Barrett Division of Allied Chemical and Dye now account for the bulk of domestic niacin manufacture. With quinoline relief dependent on a non-military economy, they may find the new dialykyl pyridine the answer to their raw material prayers. It might even pave the way for a new niacin producer.

FOREIGN. . . . . .

Alaska: Ketchikan Pulp & Paper Co.'s new $45 million mill will be capable of producing 300 tons of dissolving pulp daily. American Viscose, joint owner (with Puget Sound Pulp & Timber Co.), has contracted for 100,000 tons a year for a period of twenty years.

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Brazil: The Export-Import Bank of Brazil will now grant immediate import licenses and exchange to any importer who can obtain foreign sulfur. The action was taken to help ease the country's acute shortage. Brazilian authorities are also studying the possibility of domestic production of sulfur from pyrites deposits in the state of Santa Catarina.

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Canada: To insure a long-term supply of limestone, North American Cyanamid, Ltd., has secured an option to purchase 97 acres of land adjacent to its quarry at Ingersoll, Ont. Present capacity of the quarry averages 1,600 tons a day.

EXPANSION . . . .

Rayon Staple: The newly formed U. S. subsidiary of Courtaulds, Ltd. (*CW, July 28*) will start construction on a rayon staple plant near Mobile, Ala. Rated for an initial production of 50 million lbs., the plant is scheduled for completion in early 1953. One possible reason for the Mobile selection as a plant site is the mercury-cell caustic plant being constructed by Mathieson Alabama in the vicinity.

•

Lithopone: Production of lithopone pigment (zinc sulfide plus barium sulfate) is to be increased by about 25% by the Glidden Co. at its Collinsville, Ill., plant. This is to be accomplished by moving plant facilities from Glidden's Baltimore, Md., plant to Collinsville.

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Glutamate and Potash: The Amino Products Division of International Minerals & Chemical Corp. will spend $3 million, principally for additions to its $4 million monosodium glutamate plant at San Jose, Calif.

Also to be erected are a $2 million potash chemical plant at Carlsbad, N.M., and a $1 million research laboratory near Chicago.

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Phosphate Fertilizers: Triple superphosphate capacity, now 75,000 tons per year, is being doubled at the Armour Fertilizer Works at Bartow, Fla. The builder, Rust Engineering Co., expects to complete the installation by fall.

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Alumina: Aluminum Ore Co., Alcoa subsidiary, plans to increase its production of alumina at Mobile, Ala. Bauxite from Guiana deposits presumably will be the raw material for the added 180,000 tons per year. First production will begin by late 1952.

A new alumina works is also under construction for Aluminum Ore at Bauxite, Ark. This with the Mobile addition will boost Aluminum Ore's production of alumina by nearly 70%.

KEY CHANGES. .

E. D. Powers: To board member, American Cyanamid.

A. J. Campbell: From general manager, Industrial Chemicals Division, to vice president, American Cyanamid.

Howard Huston: From assistant to the president to vice president, American Cyanamid.

L. C. Duncan: To assistant to the president, American Cyanamid.

J. J. Murray: To assistant treasurer, American Cyanamid.

G. C. Walker: To assistant treasurer, American Cyanamid.

J. W. King: To assistant comptroller, American Cyanamid.

W. B. Ward: To assistant comptroller, American Cyanamid.

Harry G. Mitchell: To chief, Carbon Products Section, NPA.

Thomas R. Gallery: To assistant general manager, Commercial Solvents Corp. Pharmaceuticals (division).

F. G. Gronemeyer: From chief engineer, Organic Division, Monsanto, to chief engineer, Chemstrand's nylon plant.

Roy G. Heminghaus: From general manufacturing superintendent, Monsanto's John F. Queeny plant, to plant manager, Chemstrand's nylon plant.

John A. Bolt: From assistant superintendent of technical service to division director, light oils and special products, Standard Oil (Ind.) research lab, Whiting, Ind.

Arthur T. Bourgault: From supervisor of cost and accounting, phenolic products plant, to manufacturing analyst, Chemical Materials Department, General Electric Chemical Division.

Paul F. Steinhoff: To senior engineer, Process Engineering Department, Blaw-Knox Co.

J. C. Macon: From sales manager to assistant vice president, Tar Products Division, Koppers Co.

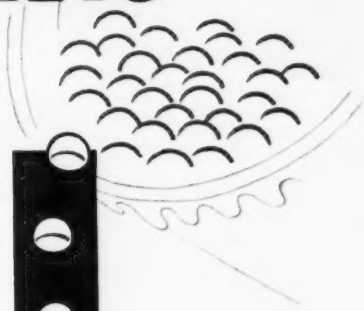
H. B. Cummings: From procurement manager to assistant vice president, Tar Products Division, Koppers Co.

* Mainly vinyl pyridines slated for synthetic fibers.

Baker

SODIUM HYDROXIDE and POTASSIUM HYDROXIDE

PELLETS



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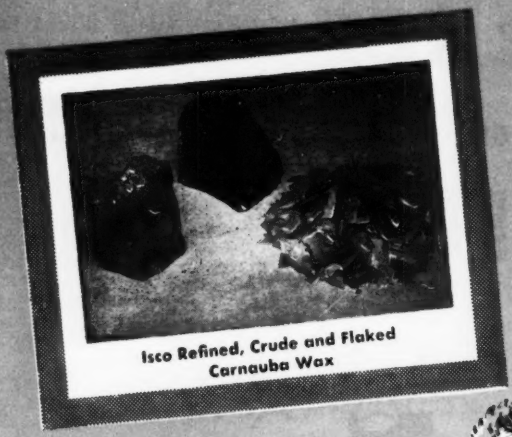

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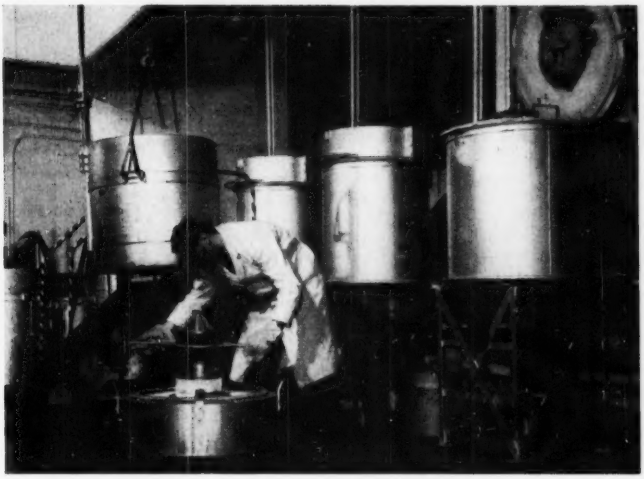

SYNTHETIC CRYSTAL: Out of the annealing oven, into the competitive fray.

Better Than Prospecting

New products, expanding facilities highlight the growing importance of a decade-old synthetic crystal industry.

Optical and phosphor crystals currently occupy the research limelight, but the synthetics have a field of application ranging from ultrasonics to textile manufacture.

Instrumentation in the process industries is in a period of striking growth. And growing with it is a youthful synthetic crystal industry; more instruments mean more crystals. It's safe to say that the trade in optical crystals has more than doubled in the past five years. Harshaw Chemical Co., a leader in the field, is now in the process of a major expansion at its Elyria (Ohio) plant to cope with the growing market. Industry's demand has spurred the search for newer, better crystals. Instruments are moving from the laboratory to the production line. That means tougher crystals that can stand up under the rigors of manufacturing conditions.

Infra-red instrumentation has sparked much of the effort to develop superior optical crystals. Sodium chloride, the conventional crystal for infra-red work, is highly soluble and subject to chemical attack. It presents no problem in the control laboratory, but the factory is another story: Rock salt crystals don't last long in the corrosive atmosphere often accompanying large-scale production. Other crystals (e.g., thallium bromide-iodide), common in infra-red spectrometry, also have their drawbacks.

A good deal of research has gone into the solution of crystal problems with some promising results. Harshaw Chemical Co. has come up with a new synthetic cesium bromide crystal which should prove useful as a replacement for thallium bromide-iodide. It transmits deeper into the infra-red range and has lower reflection losses. It's also considerably less toxic —an important manufacturing consideration.

Barium fluoride is another new synthetic for infra-red instruments. Similar to fluorite (calcium fluoride), the new crystal is a good infra-red transmitter and easily worked to different shapes. It should be valuable as instrument window material, especially where sodium chloride is too soluble.

Decade of Growth: Despite its faults, sodium chloride is still the mainstay of the optical crystal business. But the field has undergone considerable expansion since Harshaw started its synthetic crystal enterprise ten years ago. Today the company stocks about 16 crystals. Among them: synthetics like potassium bromide, silver chloride, lithium fluoride, calcium fluoride, anthracene, naphthalene, stilbene, terphenyl, and sodium and potassium iodides activated with thallium iodide.

Not all are optical crystals; the last six are used in scintillation detection of nuclear radiation. Scintillation counter crystals are phosphors which give off light when struck by radiation. Stilbene and terphenyl, commercial newcomers in this application, are also produced by Tracerlab, Inc. Calcium and cadmium tungstates, two promising new synthetics, are now in production at Linde Air Products Co. Latest work at Harshaw is centered around the development of a sodium chloride crystal activated with silver chloride for scintillation counting.

Development of the sodium iodide crystal—important to the Atomic Energy Commission—is another high-priority job. A perfect synthetic sodium iodide crystal, unfortunately, is still a thing of the future; but Harshaw has already delivered several good specimens.

Most of the above-mentioned crystals are made by a melt process. Although production techniques are fairly standard, the process is far from a cut-and-dried operation. Even if process conditions are kept constant, rarely are two crystals exactly alike when they come out of the furnace. Why this is so is a question engineers and chemists would like to have answered.

Industrial Gems: Synthetic crystals are produced by other techniques and for other applications. The Verneuil flame fusion process, devised in France at the turn of the century, accounts for a large segment of synthetic crystal output. Its products, best known as gemstones, also have a sizable industrial market. Synthetic sapphires and rubies, as well as other less celebrated crystals, come from the Verneuil process.

At the time of its European debut, the Verneuil method created quite a stir as the first really successful means of producing synthetic sapphire gems. Although Verneuil sapphires and rubies compare very favorably with the natural—they often exceed the natural in size and beauty—they never were serious competition as gems. But they found almost immediate acceptance as watch and instrument bearings. Natural watch jewels suffered a staggering defeat, were driven out of the market by their less costly synthetic brothers.

The Swiss mastered the production

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of synthetic watch bearings and maintained a stranglehold on the field until the outbreak of World War II. In 1940, Swiss exports stopped and the U.S. found itself high and dry. With military production swinging into high gear, this country desperately needed instrument bearings. A domestic synthetic crystal industry was virtually non-existent. But not for long.

Linde Air Products Co. had been toying with the idea of getting into the business. Linde had ample stocks of basic materials and know-how for oxy-hydrogen flame fusion, heart of the Verneuil process. Large volumes of impure by-product oxygen would be available from the company's new East Chicago (Ind.) oxygen plant; hydrogen would come from Union Carbide's plant at Whiting (Ind.).

Swiss Rebound: After almost a year and a half of research, Linde was in full production. After the war the Swiss came back and reclaimed the market. Today most of Linde's synthetics find an outlet as gems, but industrial uses are gaining. A sapphire crystal (aluminum oxide) is highly pure, wear-resistant, has a very sharp melting point, is practically impervious to chemical attack, and won't absorb gases. It has found use in liquid chlorine pumps, as a thread guide in nylon spinning and weaving, and as an electronic tube support. Such consumer items as ball-point pens and phonograph needles are additional outlets for man-made sapphires.

Rutile (titanium oxide), another synthetic made by flame fusion, has shown some industrial promise—mainly in electronics—but it too is chiefly a gem. Both National Lead Co. and Linde make the crystals.

Precipitation from supersaturated solution is the third important method of growing crystals. Brush Development Co. pioneered the field with Rochelle salt, a piezoelectric substance used in Brush's ultrasonic generators. Ammonium dihydrogen phosphate, another piezoelectric crystal, is another product of Brush research. Bell Laboratories, a front-runner in synthetic crystals, has made significant advances in the development of quartz crystals and, more recently, ethylene diamine tartrate.

The many companies and many materials involved in synthetic crystals provide a wide choice for the crystal user. No longer does he have to depend on limited—and often imperfect—specimens yielded by the earth to miners and prospectors.

Chemical Clock-Stopper

Late Spring frosts, perennial bane of the fruit growers, may someday be little more than a mild annoyance. Louis G. Williams, Furman University biologist, reports success in small-scale tests of a new hormone-based process to delay flowering and fruiting and minimize crop risk.

Williams' process, if effective on a large scale, would be a godsend to California and Florida fruit growers. They now rely on smudge pots to offset frost damage—a costly and not wholly effective measure. Williams believes the cost of hormone inoculation would be more than offset by the saving in labor costs and smaller crop losses.

Thus far, tests have been made in a small way on oak and mimosa trees with encouraging results. But Williams is waiting for the winter, when his researchers will undertake a more ambitious program in the peach orchards of the Piedmont section of South Carolina.

The inoculation process is based on the principle that hormones in the sap govern the emergence of a fruit tree from a dormant winter condition to its active summer state. Production of these hormones is influenced by light and temperature. But a chemical agent might well alter the normal process, retard the onset of budding and flowering.

Next Step: Identity of Williams' hormone is a secret; he does say, however, that the amount of hormone needed for favorable results varies with each type of tree. The next step in the development program will involve determinations of optimum doses for different species.

Minimizing weather damage to fruit crops by the use of hormones isn't a startling new concept. Experiments aimed at delaying flowering and fruiting have been going on for more than ten years with little success. Many chemicals have been tried, but so far none has been of practical value. If Williams has done the job, he has succeeded where many have failed before.

•

Hot Vitamin: Researchers at Brookhaven National Laboratory have recently succeeded in making radioactive vitamin B_{12} by bombarding the fermentation product with neutrons. The neutrons convert the cobalt contained in the vitamin to its radioactive isotope. The modified form will be

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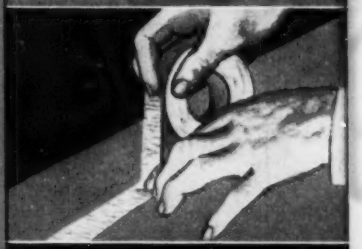

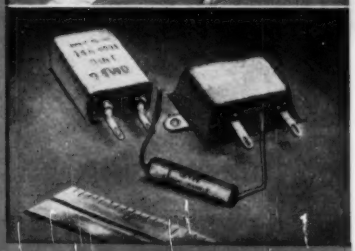

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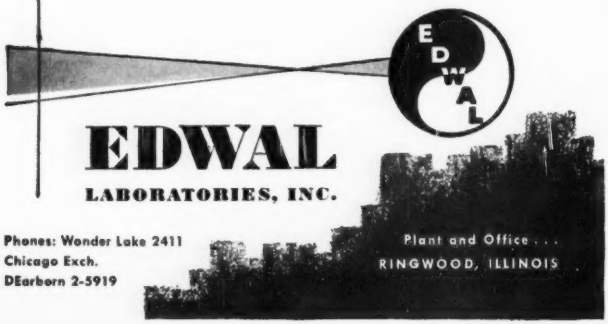


RESEARCH . . . . . .

used in experiments designed to reveal the vitamin's role in controlling pernicious anemia.

•

Oil Saver: U. S. Department of Agriculture chemists at the Northern Regional Research Laboratory have found that phytic acid lengthens the storage life of soybean oil by preventing the development of off-flavors. Exact mode of action is not yet known, but the acid probably acts as a metal scavenger to prevent traces of metals from causing chemical changes in the oil.

•

Research Boost: Sumner Chemical Co. is now completing major additions to its research and plant facilities at Elkhart, Ind., and Zeeland, Mich. The company's research staff is also being expanded.

•

Grad Grant: Plaskon Division, Libbey-Owens-Ford Glass Co., is sponsoring a graduate fellowship at Carnegie Institute of Technology to begin this month and run for one year. Object: synthesis of 3,3',5,5'-tetrafluorohydrazobenzene.

•

Parasite Probe: Sterling-Winthrop Research Institute teams are now hot on the trail of new drugs to combat schistosomiasis, a widespread Oriental parasitic disease. Evaluation of potentially valuable compounds is carried out on infected laboratory animals.

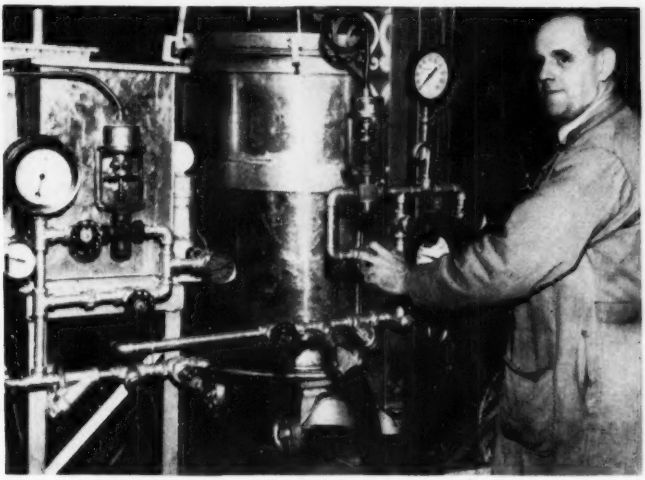
Another tropical disease will shortly come in for its share of attention. Reginald Hewitt, Lederle Laboratories parasitologist, has just taken off on a round-the-world expedition for field research. Hewitt headed up the Lederle group responsible for the development of a drug for the prevention of filariasis. He will get first-hand data on its effectiveness.

•

Light Concrete: A U. S. Department of Agriculture research effort is directed toward the development of a good lightweight concrete. One phase of the work, in cooperation with Michigan State College, is concentrated on the substitution of corncob pellets for the coarse aggregate. In another project, researchers are using commercial detergents to introduce air bubbles into the concrete.

•

Alcoholic Time-Saver: A new, fast soil selection method using methyl alcohol will facilitate substantial time savings in the construction of highways, airfields, etc. The method was developed at the U. S. Department of Commerce's Texas Engineering Experiment Station for field use.



ARTHUR D. HUGHES: More control, less steam, less water.

Portable Peppermint Plant

Use of automatic instead of manual control in new peppermint oil still is expected to reduce steam needs by 25%; cooling water requirements by 50%.

A portable edition of the new distillation unit is now on a safari through the peppermint fields of Oregon to demonstrate these advantages to the producers.

A portable pilot plant for the distillation of peppermint oil from peppermint hay began its first field-test run at the Dale Turnidge farm near Jefferson, Ore. The effect of hay drying time and long vs. chopped hay on the oil yield is to be checked first.

The new still is a development of Prof. Arthur D. Hughes at Oregon State College under the sponsorship of chewing gum-maker and peppermint oil-user William J. Wrigley, Jr. Co. of Chicago.

About three years ago Hughes and another colleague at Oregon State College were called into the peppermint oil-producing area to test some new boilers that apparently were not meeting guarantees. While there, they became interested in the steam distillation process used to recover oil from peppermint hay. It was obvious to Hughes that several improvements to the then-forty-year-old distillation technique were in order.

Literature checks indicated that no engineering analysis of the process had ever been made. Under Wrigley sponsorship a study of the process from a physical and thermodynamic viewpoint resulted in the new all-aluminum pilot plant. Stainless steel will work, but it is more difficult to fabricate.

The new unit is mounted on skids designed to fit a two-wheel trailer; the unit moves on the trailer into the field and alongside a grower's plant, permits on-the-spot study of the effect of varying conditions on the oil.

Much of the loss in present batch-type distillation plants is due to the complete manual control of the operation. To play safe the operator usually uses more steam and condensing water than dictated by most economical operation. Furthermore, present separators for splitting water from the condensed mint oil lose sizable amounts of mint oil in the upper water layer.

Less Steam and Water: Hughes estimates that up to 25% of normal steam needs can be saved by "cutting back" the steam flow after the load is heated up. In addition, this reduction in steam flow for a major part of the process, plus the use of an automatic control valve on the cooling water, will save 50% or more of the cooling water normally used. Nor is the separator being neglected. A new-type separator is being developed that will give more complete separation of the oil from the condensate before the latter is discarded.

The condenser is of the submerged type. Cooling water to the condenser may be manually (as in most existing plants) or automatically controlled by a thermostatically operated valve. A condensate temperature of 110 to 110 F gives faster separation of the oil from the water, yet causes no serious evaporation losses.

On the basis of many laboratory tests run so far on baled peppermint hay, Hughes has found that the temperature of the steam and mint oil vapor leaving the tub is practically independent of the inlet steam pressure once the tub of hay is initially heated. Also, after the heating-up period, the rate of oil distillation is somewhat independent of the quantity of steam passing through the hay. On this basis the "cut back" on steam was an obvious saving measure.

Potential: Hughes is now in the midst of his safari through the mint fields to show the farmer what can be done to improve his yields. After leaving Jefferson, the first stop, the plant will be moved to Coburg, Ore., and then to the Clatskanie area. By running the farmer's hay through the new pilot plant, first as the farmer is doing it now, and second as Hughes thinks it should be done, he hopes to convince the farmer of the utility of the money-saving devices.

All that is needed to make a substantial saving, Hughes says, is to follow a few basic principles of instrumentation and operation—and he has his traveling plant to prove it.

The new pilot plant can be manually controlled (as are most present commercial stills) or it may be completely automatic, except for the loading and unloading of the hay, as Hughes recommends. This design enables the plant to show the farmer the faults in his present operations, illustrates the advantages of the new, automatic design. The plant is completely instrumented so that all pressures, temperatures, weights, and flow rates are measured and controlled.

Constructed on a scale of 1/30th of normal plants, the still has a run capacity of 85 gal. and will produce about 1 lb. of oil per run. This size makes for portability and at the same time produces enough oil for accurate analysis.

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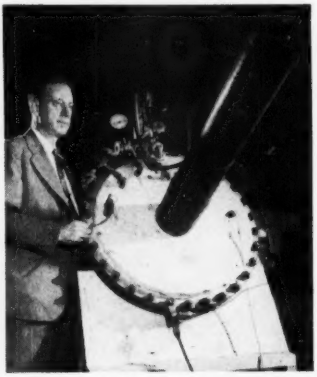


HILL: Use boiling fluorocarbon to cool transformers.

Cooling By Boiling

Boiling fluorocarbons may be the answer to the age-old question of how to dissipate the heat generated in electrical transformers easily and efficiently.

Power plant engineers are currently expressing considerable interest in a development that uses the vaporization of liquid fluorocarbons to cool transformer cores. The new method, which sprays the coolant on the core in a closed system, eliminates the need for cumbersome transformer oil, the coolant used in the conventional transformer installations. Omission of the oil plus the high dielectric strength of the fluorocarbon vapor insulation make it possible for fluorocarbon-cooled units to be designed that will weigh ¼ to ⅓ less than the oil type transformers.

Experimental Units: The idea for this new method of transformer heat removal originated with C. F. Hill of the Research Laboratories of the Westinghouse Electric Corp. Paul Narbut, a fellow Westinghouse engineer from the company's Transformer Division, supervised the building of the two experimental units which have operated using fluorocarbon coolants.

Hill and Narbut point out that fluorocarbons were chosen for the spray cooling job because of two main reasons: (1) their boiling point and heat of vaporization are suitable for the task, and (2) they have a high dielectric strength and impulse strength at low pressures. In fact, the dielectric strength of fluorocarbon vapor at atmospheric pressure is greater than that of transformer oil for 60-cycle current.

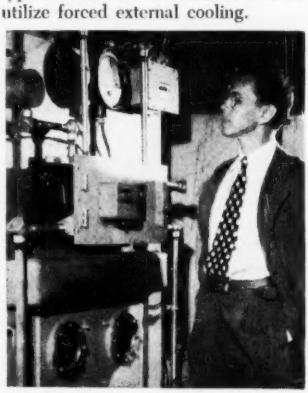
Quick-Cooling: The first of the Narbut-constructed transformers was a modification of the standard dry type unit to which fluorocarbon cooling equipment was added. It dissipated ten times more heat than the standard unit and delivered over 350 percent of its rated capacity. Although power losses were too high for commercial operation at this load, the experimental run gave the inventors encouragement to push the development further.

The second experimental transformer was designed from the outset for vaporization cooling and, as expected, the results were even more astounding. It has operated efficiently at constant load since the first of this year.

Much of the know-how gained during the development and operation of this second unit is being incorporated in a vaporization-cooled network transformer that is presently being manufactured for the Consolidated Edison Co. of New York. This third unit will undoubtedly provide many of the answers needed to design a final commercial unit.

Westinghouse states that the new transformers will be as safe or safer than the present types. Not only is the fluorocarbon coolant non-flammable, but it will serve as a fire extinguisher. Also, vaporization cooling, provided by spraying the liquid on the transformer core, gives such excellent heat transfer that the external cooling surface can be reduced and a more compact coil assembly utilized.

Although the extremely high cost of the fluorocarbon may make the unit cost of the transformers slightly higher than for present types, it is expected that the new units will find application in locations where space and voltage requirements rule out dry-type transformers. They are so compact that they can replace liquid-type installations which have had to utilize forced external cooling.



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LONG HOP: From rural mailbox to chemical plant safety is a long jump. But General Electric Co. made the hop at its silicone polymer plant at Waterford, N.Y. A rural mailbox provides a handy weatherproof receptacle for the plant operator's matches and cigarettes when he enters a "dangerous" area.

Visual Control

Chemical plant production scheduling will be controlled more readily and will be more easily observed with Remington-Rand's new Multi-Flash signals. In this system a card with a visible margin is devoted to each process. Numbers or letters are placed in this visible margin of the card, each number referring to a step in the process. Also each card has one plastic tab per number. This can be drawn down into position by inserting a pencil in a small hole in the tab. And the position of the tab specifies the status of the operation.

The cards are then placed in a Kardex file, a file where the bottom margin of each card is visible. In this position a quick and accurate picture of the process can be obtained.

In the past bar chart signals have been used for this purpose. But they are not suitable where the sequence of operations in the plant varies from time to time. Example: dyestuffs intermediates plant.

•

Insulation Strapping: Maintenance of a constant pressure by strapping on the insulation around tanks, drums, or pipes, which expand and contract in circumference, is achieved in a new partially corrugated stainless steel strap made by A. J. Gerrard & Co.

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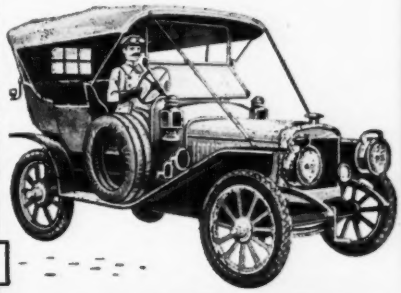

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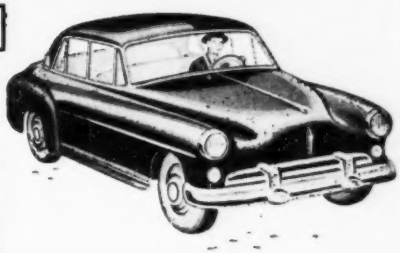

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*MAN MADE MOUNTAINS

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The discharge lines are placed so that the liquid sulphur is spread in an even layer over the entire surface of the vat and is permitted to solidify uniformly. If the liquid sulphur is introduced too rapidly or is not properly distributed, pockets of liquid sulphur will be covered by a crust and remain in the solid sulphur. The low heat-conductivity of sulphur might keep such pockets liquid for a year or more.

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BOTTLES THAT BOUNCE: More varieties for more products.

Squeeze That Pleases

More chemical specialties and pharmaceuticals are turning up in flexible polyethylene bottles, established glamor containers of the cosmetics field. Manufacturers will fill about 100 million this year.

Advantages are their chemical inertness, light weight, unbreakability and squeeze-dispensing feature. Permeability rules out some products, but most can be packaged in polyethylene.

Polyethylene bottles are not only growing "up" *(CW, July 21* and *Aug. 11)* on the development of one- and two-gallon containers). They are growing "out."

The cosmetics field, in which the smaller spray-bottles achieved their first major success (as containers for underarm deodorants), is using them for a wider variety of products. Pharmaceutical manufacturers are already packaging—or at least testing products for packaging—in polyethylene containers. And specialties makers are proving a product doesn't need the high mark-up of a cosmetic to warrant such a bottle; they are putting mundane materials like window cleaners, room deodorants, graphite lubricant for locks and windshield de-icers in these flexible containers.

Features that have aroused consumer enthusiasm for cosmetics in polyethylene bottles are giving the newer products the same sales boost: They are unbreakable, light in weight, inert to most chemicals and flexible. The latter property allows a product to be controlled-dispensed; the user just squeezes the container, which can be equipped with either a spray or a simple plug, to get the desired amount of material.

Can't Mark Time: Principal producers—Injection Molding Co. (Kansas City, Mo.), Elmer E. Mills Corp. (Chicago) and Plax Corp. (Hartford, Conn.)—are not letting the shortage of polyethylene slow down their new product development work. An industry estimate is that such containers have a potential market of 5 million gross per year—glass bottles sales run about 100 million gross—and each wants to be in a fore position when supplies of the plastic are no longer critical. Total production this year will run less than a million gross—100 million bottles is one estimate—and probably will be limited to a similar number next year.

Although the 4-oz. Boston Round is the most popular bottle, polyethylene is currently being turned out in more than 60 stock molds and in a growing number of private molds. A great many cosmetic manufacturers insist on a private mold, but various combinations of plugs and closures can give a product distinctive identity with standard molds. Slight modifications of standard molds—custom color, custom neck, special cap or special base plates—are other ways of achieving a special package.

Where a product is to be dispensed as a spray, the bottle is fitted with a spray plug. The plug orifice is of one size, but the size of the tubing extending down into the container is varied to accommodate the viscosity of the material. Plugs are generally press fitted, but if the manufacturer doesn't want the bottle used more than once, they can be heat-sealed. A simple plug is used for shampoos, powders, creams and lotions.

Everything Doesn't Go: Because polyethylene is unaffected by most chemicals, it would seem that it can hold anything. That's not true, however, for it is permeated by such materials as mineral oils and chlorinated solvents. Happily for bottle makers, it resists the passage of alcohol and water, more often present in formulated products.

The bottle molders run screening tests on a customer's product, but generally leave the final testing up to him. Plax Corp., for example, has been running tests on all kinds of materials for about four years. It puts a given material in a bottle and weighs it once a week for four weeks. From this it calculates the net product percentage loss per year, and will either recommend, advise against, or question putting a product in its package. On the average, it recommends about 70% of products tested (and it tests all submitted regardless of whether past experience indicates the report will be favorable or unfavorable), turns down 15% and questions 15%.

Many materials that permeate the plastic, however, may be packaged in it if the product is to be used in a short period of time. Or they can be sold in an "economy size kit" comprising a large glass storage bottle from which the polyethylene dispenser bottle is filled from time to time.

Another nuisance is material that gives a greasy feel to the bottle—it permeates beyond the evaporation rate. One solution is to increase the wall thickness, since permeability decreases as the thickness of the plastic increases. Injection Molding Co. has another: its patented double-walled jars, which it hopes will solve most permeability problems.

Formulations that take up oxygen from the air space in the container have to be guarded against too, for

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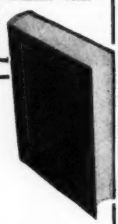

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the partial vacuum may cause the bottle to collapse. Here, the shape can be altered so deformation is not noticeable, and the bottle should be filled completely.

Label Progress: A manufacturer can use labels, printing or an embossed legend incorporated into the mold to identify his product. Paper labels can be secured either with adhesives or pressure-sensitive tape. Printing can be accomplished by means of hot stamping or screen printing, although decalcomania transfer and offset are coming into use. The bottles must be pretreated prior to printing, and checked to see that materials which permeate the bottle in amounts too small to harm the formulation or cause product loss, do not affect the inks.

Either the molder or the customer may handle the printing. Plax will do the printing or set up the machinery in its customer's plant. Injection Molding, on the other hand, prints all its own bottles.

Not Comparable: There is no denying that polyethylene bottles are more expensive than glass, and that products now going into them would have otherwise been packaged in the older containers. (One molder charges $75.40 per thousand for standard-mold 4-oz. bottles in quantities of 100,000-250,000). Yet, polyethylene proponents declare that the two container materials cannot be compared on a cost basis, for the new bottles deliver distinctive, sales-getting appeal that puts them in a class by themselves.

By far the greatest user is still the cosmetic industry, where style comes first and cost far down the line. Pharmaceutical applications are growing rapidly: A nasal applicator to give a controlled drop is one of the big ones, and tests are under way to package penicillin and other antibiotics in polyethylene. But stronger evidence that the container can make headway in fields where costs are more important is the large number of household specialties showing up in the squeeze bottles. Boyle-Midway has recently introduced its Aeromist glass cleaner in one of these bottles *(CIW, April 28)*, and molders are jealously eyeing other large-volume outlets. They'd like to crack the liquid detergent field but there cost is still a bar.

B. W. FLOERSCH: His polish needs only a light touch.

Easy on the Finish

Ryan Aeronautical Co. has developed a new formulation which polishes aluminum without materially reducing the thickness of the metal. A high percentage of fine-mesh uniform grain silica cleans but doesn't grind into the surface.

The work of B. W. Floersch, chemical research engineer for the San Diego, Calif., airplane manufacturer, the polish has been designated merely as Raco 220. It has proved so successful that Ryan now has transferred its production from the plant engineering laboratory to a subcontractor which is turning it out in 5-gal.

lots for both Ryan and Boeing Airplane Co.

Boeing initiated the development by requesting Ryan not to use a conventional polishing agent on the C-97 aft fuselage sections being built at Ryan.

Their gleaming aluminum skins acquire vari-colored strains in the fabrication process, and polishing is carried out strictly for aesthetic reasons. The company feared losing some of the vital 2S aluminum coating.

Floersch then developed Raco. This removes the dingy factory surface blemishes without the danger of thinning out, through abrasive action, the 2S aluminum coating over the 24ST dural base alloy. The stains the new polish attacks successfully are surface mars, which do not require an abrasive polish as do marks resulting from corrosion.

Roller Bearing: The polish contains 4 lbs. of 400-mesh silica to the gallon, suspended in a water solution. The unusually high content of the fine-mesh uniform grain silica gives a "roller bearing" action on the surface without grinding into it.

An organic suspending agent is introduced to keep the polish from packing. Phosphoric acid in the formula passivates the aluminum and helps prevent formation of black smut such as occurs in many polishes. A buffer of disodium phosphate reduces the corrosive power of the phosphoric acid. Aluminum samples exposed to the polish for a month showed no signs of tarnishing nor any measurable loss in weight.

Ryan applies the polish to the skins during final assembly clean-up by means of a cloth pre-dampened with water. Gentle pressure applied to the cloth is all that is required. After a section has been cleaned, the polish is removed by means of a moist cloth. It is not necessary to remove the agent with a stream of water as is required with many commercial acid polishes.

Since Ryan began using it, the firm has found the polish also has an anti-corrosive value. This has been demonstrated on external fuel tanks being built for combat planes. The polish is applied to the external skin surfaces, particularly along the seam welds.

"We found that it removes the copper which is picked up from the rolls of the seam welder," Floersch explains. "Copper and aluminum make a corrosive electric cell, and use of Raco 220 inhibits such galvanic corrosion by removing the offending copper."

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Tough Customer

Unable to get the quality water emulsion wax it wants under current Federal buying specifications, the U.S. Public Buildings Service makes its own—30,000 gallons a year produced in an experimental factory.

Through this large-scale experiment, the Government's PBS now has worked out a formula for a wear-resistant emulsion wax. Even with the high traffic found on Government building floors, the wax holds up for a six-month period. The best wax the Government can buy under current specifications, PBS says, will last only for six weeks to two months.

Chemical specialties manufacturers view the establishment of these "large scale tests" with alarm, feeling that production of 30,000 gallons of wax is hardly in the class with experiments. The Chemical Specialties Manufacturers Association, in a bulletin sent to members, considers this plant as a start towards competition with private industry. It repeats rumors that the Government's General Services Administration is thinking of manufacturing liquid soaps and insecticides.

PBS started its wax factory in 1948, after making a 1947 request for changing specs to provide a longer-wearing wax. Since then, the wax formulation has been improved. Having large proving grounds—whole buildings to test each variation—was a big help with the project.

Exact formulations is secret right now, but on that nebulous date when the specs are changed, the service will give it out—and would be especially happy to do this if allowed to set specifications on a formula basis.

Reason given by PBS for not releasing the formula: If it were released, some firms might say in their sales promotion that their formula was sanctioned by the Government.

While the exact formulation may be new, the ingredients don't seem to be—ammonia, morpholine, triethanolamine and loba B resin in the dispersion solution, in which carnauba, microcrystalline wax, oleic acid, morpholine, sodium alkyl sulfate and colloidal silica are suspended.

Above Ceiling: Present wax purchases by the Government for its buildings are at the average price of about 90 cents per gallon. The formula PBS has worked out would probably cost $1.15 a gallon. This, however, it says, would be cheaper in the long run because of superior wearing qualities.

The present 30,000 gallon a year output is described as just a drop in

the bucket of the Government's total wax needs, though it is a large percentage of its needs in the District of Columbia.

No expansion of facilities is planned, and as PBS explains, "When we find a way to get the specifications changed, we'll shut down."

Manufacturers' Feelings: Closing down of such a factory can't come too soon, according to specialty houses. The CSMA board plans a discussion of possible action at its September meeting on what it considers a clear encroachment by Government on private industry.

•

All-Use Cleaner: West Disinfecting Co., of Long Island City, has developed a new cleaner combining the advantages of vegetable oil soap, synthetic detergent and a polyphosphate water softener. In soft water, it can be used at a 1:45 dilution, and in hard water, it can be diluted 1 to 10 without clouding or loss of detergency properties.

•

Tin Tapewormer: Di-n-butyl tin dilaurate has been found to be an effective compound for removal of tapeworms from poultry by Dr. Salsbury's Laboratories, Charles City, Iowa. The organo-tin compound has been given the trade name Butynorate, and is marketed in combination with nicotine and phenothiazine as an all-purpose poultry wormer, Wormal.

•

Latex Stabilizer: Six new stabilizers for latex paints have been developed by Borden's Chemical Division. The compounds, marketed under the trade names Cascola, Cascolac and Protovac, eliminate the need for heating and mixing preparations; minimize storage problems; give high water resistance and improved resistance to freezing; provide easier brushing and a higher color saturation in the paint.

•

Industrial Cleaner: A formulation recommended for metal cleaning in one-stage washers and before painting is marketed by the DuBois Co., Cincinnati, under the name Super-Mul. The cleaner does not attack metals or painted surfaces and will not deteriorate machinery or equipment. When used at low concentrations in rinses, it provides a temporary rust inhibiting action.

PICTURES IN THIS ISSUE:
Cover (top)—General Aniline & Film Corp.; Cover (bottom) and p. 19—Harshaw Chem. Co.; p. 10 (top, right)—Intl. Chem. Union; p. 12—Bob Lackenbach; p. 13—Will Hays; p. 23—News Bureau, Oregon State College; p. 26—Gen. Elect. Co.; p. 30—Ryan Aeronautical Co.

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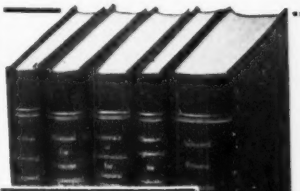

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BOOKS . . . . . .

Theory of Electrons, by L. Rosenfeld. Interscience Publishers, Inc., New York, N.Y.; 119 pp., $2.25.

An advanced treatise on the theory of electrons, this volume is derived from a series of lectures given by the author at several universities. It is concerned mainly with explaining the basis for an atomistic interpretation of the properties of matter—whether electrical, magnetic or optical. Entering into the discussion are Maxwell's theory of the electromagnetic field, the rigorous theory of dispersion and analytical mechanics.

Dynamic Motion and Time Study, by James J. Gillespie. Chemical Publishing Co., New York, N.Y.; 165 pp., $3.75.

From the viewpoint of psychology rather than mathematical analyses, the author delves into the problem of time and motion in tackling the problem of maximum efficiency. Work activity is related to work psychology in such a way that time and motion techniques are evolved which take into account the factors of individual reactions, workman approval or rejection, surroundings, group membership, etc. In this way, the author points to a solution for maximum efficiency in production which would be approved by management men and workmen alike.

Beet Sugar Technology, edited by R. A. McGinnis. Reinhold Publishing Co., New York, N.Y.; 580 pp., $10.

Prepared by a group of experts in the field, this volume covers every phase of the beet sugar industry. Special emphasis is placed on the technical and agricultural aspects of the subject as well as the chemical engineering methods involved. Also discussed are historical background, economics, growth factors and extraction methods —as followed both in this country and abroad.

Briefly Listed

PLATING-ROOM CONTROLS FOR POLLUTION ABATEMENT, a 20-page manual prepared by Ohio River Valley Water Sanitation Commission as a guidebook, especially for managers of metal-finishing plants, indicating operating methods and techniques to be utilized in order to reduce waste discharges and thereby curb stream pollution. Orsanco, 414 Walnut St., Cincinnati, Ohio, 50¢.

THE FUNDAMENTAL ASPECTS OF LUBRICATION, by O. A. Beeck and other authors, a 244-page volume of the Annals of The New York Academy of Sciences concerned with the basic problems of lubrication and recent research along these lines. Among the 13 papers offered, several deal with full-fluid and thin-film lubrication, others with various aspects of surface films in relation to solids. New York Academy of Sciences, 2 East 63rd St., New York, N. Y., $4.

MINERAL WOOL INSULATION SPECIFICATIONS & STANDARDS, insulation handbook containing 21 specifications, set by four Government agencies and the ASTM, for both high and low temperature mineral wool insulations. Manual is written as guide for consumers, insulation specifiers and contractors. Industrial Mineral Wool Institute, 441 Lexington Ave., New York, N.Y., $3.20.

PROCESS FOR CRACKING HEAVY HYDROCARBONS, translation of report (#95769) by the Julius Schindler G.m.b.H., describes process for thermal cleavage of petroleum or petroleum residues which gives high yields of low-boiling point aromatics—valuable as fuel components. Available from Research Information Service, 509 Fifth Ave., New York, N.Y., at $7.75.

SABOTAGE AND PLANT PROTECTION, a 25-page U.S. Chamber of Commerce publication, comprises proceedings and discussion from thirty-ninth annual meeting; here are addresses given on the subject plus a review of pertinent factors such as principles of plant protection, training facilities, Russia's atomic bomb, etc. From the Chamber of Commerce of the United States, Department of Manufacture for 50¢ each.

MEETINGS . .

Natl. Agric. Chems. Assn., annual meeting, Essex & Sussex Hotel, Spring Lake, N.J., September 5-7.

Amer. Soybean Assn., annual meeting, Fort Des Moines Hotel, Des Moines, Iowa, September 6-8.

Natl. Instr. Conf. & Exhibit, Sam Houston Coliseum, Houston, Texas, September 10-14.

Amer. Inst. of Chem. Engineers, national meeting, Sheraton Hotel, Rochester, N.Y., September 16-19.

Conf. on Ind. Experimentation, Columbia campus, Columbia Univ., New York, N.Y., September 17-21.

Natl. Mineral Feeds Assn., annual convention, Bismarck Hotel, Chicago, Ill., September 18-19.

Food, Drug & Cosmetic Law Div., Amer. Bar Assn., annual meeting, New York Univ. Law Center, New York, N.Y., September 19-20.

Fundamental Research Conf., national convention, Appleton, Wis., September 19-21.

Drug, Chem. & Allied Trades Sect., New York Bd. of Trade, annual meeting, Shawnee-on-Delaware, Pa., September 20-22.

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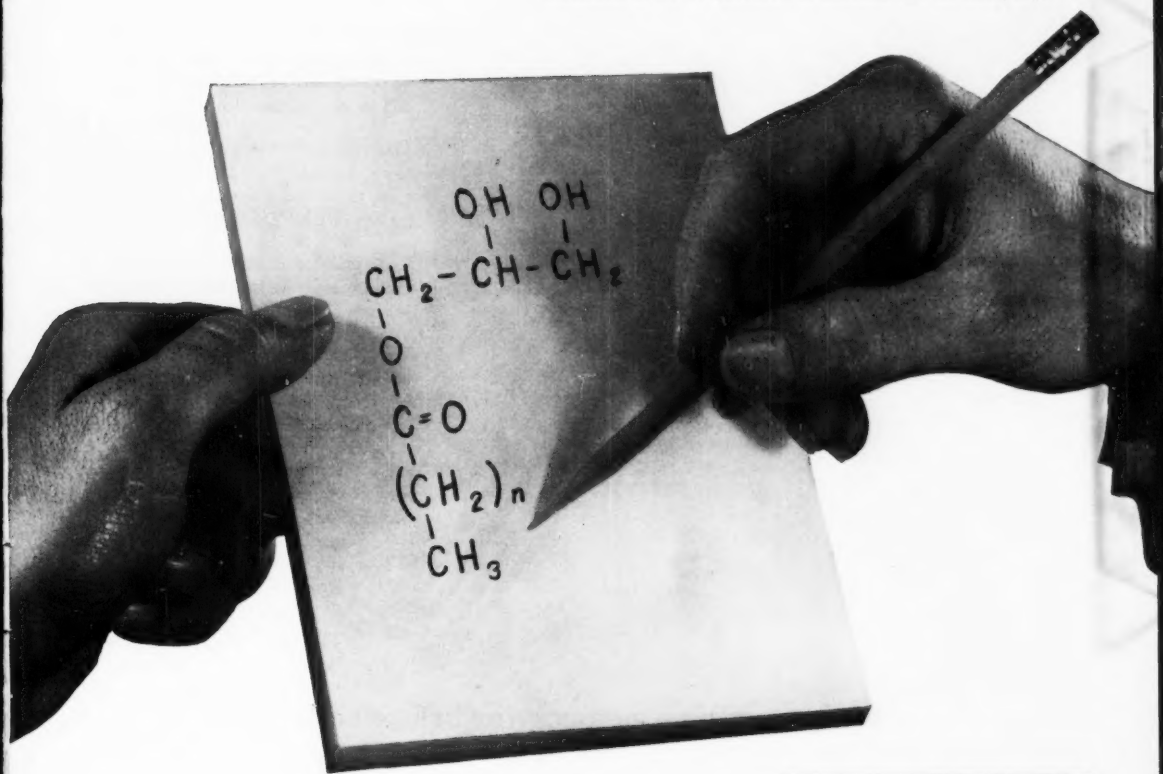

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This calls for better productivity all along the line. Not just in making guns, tanks and planes, but in turning out civilian goods, too.

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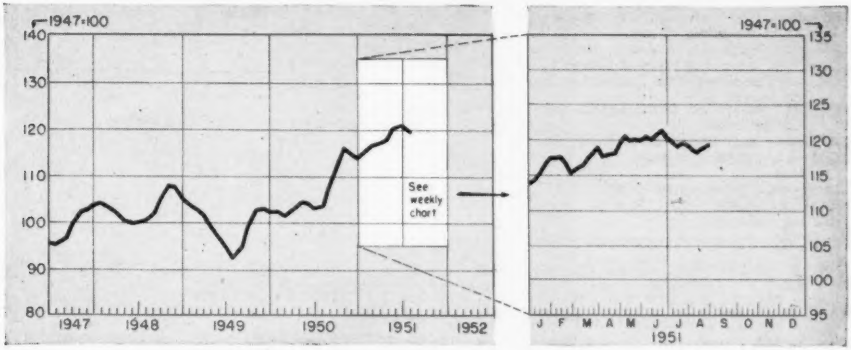


CW Index of Chemical Output—Basis: Total Man-Hours Worked in Selected Chemical Industries

The National Production Authority is seeking detailed information from industry this week about the impact of defense orders upon chemical output. Object: to devise a plan for more equitable distribution of defense orders among producers. Such a plan, NPA hopes, will quiet complaints from industry that a few producers are carrying the defense load brunt.

It is still too early to tell what the Controlled Materials Plan for metals will mean to the defense order setup. The manufacturer of chemical equipment requires metals, and the manufacture of chemicals requires equipment. If production schedules should be interrupted unduly by restrictions of CMP, NPA indicates that it may come through with a regulation to remove most chemicals from defense order ratings.

But don't expect the tough-to-get chemicals, especially those required by the military, to be taken off the critical list soon.

The NPA gave evidence of its kind-to-industry attitude by establishing a lead time of 15 days advance notice for orders upon producers of six chemicals: phthalic anhydride, aniline, styrene, phenol, p-tertiary butyl phenol, and chlorbenzene. Lead time for carbon tetrachloride has been raised from 15 to 20 days.

Those who make and use their own phthalic anhydride will be more fortunate that those who make it for sale. For producers will not be required to fill rated orders above 35% of each month's production intended for sale, whereas captive use is not subject to these limitations.

Despite these liberalized edicts, supplies of phthalic anhydride are actually tightening. Reason: smaller naphthalene imports, heavier phthalic demand. Of this year's production of 243 million pounds, some 148 million will be used in protective coatings. And even when the production rises to an expected 350 million pounds in 1953, protective coating manufacturers will require a lusky 195 million pounds.

If synthetic resin makers can get phthalic, they can surely get glycerine. Expected production this year of 240 million pounds is 1% above expected demand.

MARKET LETTER

WEEKLY BUSINESS INDICATORS	Latest Week	Preceding Week	Year Ago
Chemical Industries Output Index (1947=100)	120.0	119.8	109.1
Bituminous Coal Production (Daily Average, 1000 Tons)	1,715.0	1,696.0	1,884.0
Steel Ingot Production (Thousand Tons)	1,995.0	2,007.0	1,873.0
Wholesale Prices—Chemicals and Allied Products (1926=100)	140.1	139.9	120.6
Stock Price Index of 14 Chemical Companies (Standard & Poor's Corp.)	253.1	254.7	191.7
Chemical Process Industries Construction Awards (Eng. News-Record)	$31,418,000	$45,825,000	$4,032,000

MONTHLY BUSINESS INDICATORS — WHOLESALE PRICES (1926=100)	Latest Month	Preceding Month	Year Ago
All Commodities (Other than Farm and Foods)	170.0	170.5	151.6
Chemicals and Allied Products	139.4	142.9	118.1
Chemicals	143.1	144.0	119.1
Drugs and Pharmaceuticals	184.7	185.3	129.1
Fertilizer Materials	119.0	115.1	110.1
Oils and Fats	139.3	165.8	126.0

Plastic coatings output, now in a summer letdown, is slated to resume its upward rise this fall. Figures gathered by the Plastic Coating and Film Association indicate a healthy increase for the first six months of 1951 compared to the like period of 1950. Plastic coated fabric gained some 25%, pyroxylin coatings were up 15%, and plastic film (over 10 mils thick) shot up 60%.

The CW chemical output index has already levelled off, and once more is beginning to edge upward. This week marks the third successive rise, and the index now has climbed back to the 120 mark, just 1% below the peak in June. With a fall upturn due and more defense business on the way, it is likely that a new chemical output record will soon be reached.

Another sign that demand is on the increase: a general levelling out in wholesale prices of chemicals and allied products, and evidence in many categories of a definite upturn. Although prices cannot rise substantially above present levels under the ceilings allowed by the Office of Price Stabilization, the firmer tone signifies a real demand pickup.

Despite the steadier over-all demand for chemical commodities, there are exceptions. Examples: prices of fats and oils are still dropping; rayon demand is in a slump.

This week, American Bemberg cut back production of rayon yarn in its plant at Elizabethton. The reason: too much retail inventory.

The OPS is still trying to unravel many pricing problems. This week, under Amendment 23 to CPR-22, a number of chemicals were removed and transferred back to the General Price Regulation of last January. Object: to place a chemical made by several methods under the same general pricing setup.

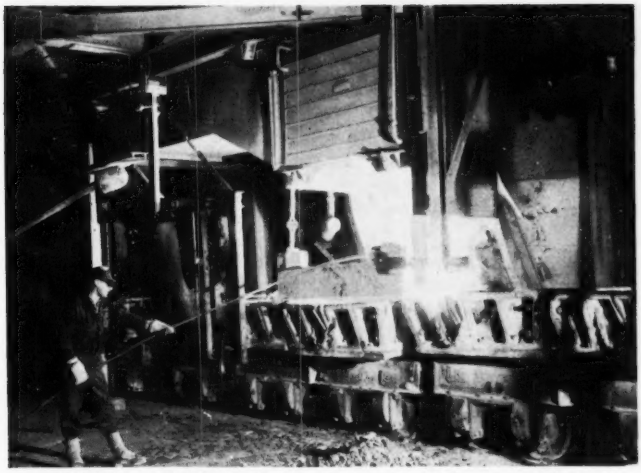
Affected by this action are such chemicals as sodium silicofluoride, butadiene from non-petroleum sources, sulfur, carbon black, and products of hardwood distillation.

In particular, OPS doesn't want to be in the position of curbing production of sodium silicofluoride, now needed to meet the increasing demand for fluoridation of drinking water. Under the CPR-22 regulation, the base period would have pegged the price at the lowest level of recent years. The price had risen, however, by the time the General Regulation went into effect.

SELECTED CHEMICAL MARKET PRICE CHANGES — Week Ending August 27, 1951

	Change	New Price		Change	New Price
UP					
Turpentine, gum, Sav., gal.	$ .01	$ .695			
DOWN					
Coconut oil, tanks, Pac. ports	$ .005	$ .13	Rosin, w.w., Sav., cwt.	$ .03	$8.37
Palm oil, drums	.01	.21			

All prices per pound unless quantity is stated



MAKING CARBIDE: Producers seek more power for more product.

Carbide: A Third More

Manufacturers of calcium carbide embark on lusty expansion program to meet demand for acetylene and cyanamid. Bottleneck: power facilities.

Two biggest producers will get still bigger with increased output at Niagara Falls, Ashtabula, and Calvert City.

Competition looms between acetylene from carbide and acetylene from natural gas. Outlook: plenty of business for both.

The rising demand for acetylene is the chief spur to the expansion of calcium carbide manufacturing facilities now in progress on many fronts. For, in spite of the lure of new interesting processes to make acetylene, many will still rely on calcium carbide plus water.

Unfortunately for these acetylene-hungry consumers, there will be more than a slight delay in the expansion of carbide installations. In fact, a carbide sufficiency can't be expected until 1953.

More Power: The reason for the expected delay in the carbide boom can be summed up in two words: power difficulties. Electric power is probably the most important factor in the manufacture of carbide. Its cost is a critical determinant of the entire operation. And even when its cost is economical, there is the added difficulty of obtaining the needed heavy electrical equipment to control and use it. In these days of material shortages the problem is an especially tough one.

Who's In: The current carbide expansion is anything but minor. One producer estimates that by the time it is over, the total U.S. capacity will be 250 thousand tons bigger than it is today. The major part of this boost will take place in the plants of the two biggest producers: Electro-Metallurgical Division of the Union Carbide and Carbon Corp. and the National Carbide Division of the Air Reduction Co., Inc.

Electro - Metallurgical has just brought in the last of four new carbide furnaces at the company's largest plant at Niagara Falls, N.Y. Acetylene, generated from this carbide, is piped to close-by plants of Du Pont, Niagara Alkali, B. F. Goodrich and Carbide and Carbon Chemicals Division of UCC.

But most of Electro-Metallurgical's expansion is taking place at the company's installation at Ashtabula, Ohio, where it actually operates two plants; one company-owned and the other Government-owned. Three new furnaces are slated for the company property, their power to be furnished by steam generation. The first of these furnaces will begin operation during January of next year.

Still Another: The National Carbide Division of Air Reduction Company, Inc., is not to be outdone in expansion. Work is going ahead on the new $10 million plant at Calvert City, Kentucky, which will have an initial rated capacity of around 142,500 tons annually. Two new furnaces will be built, to be brought in early in 1953. This development at Calvert City will just about match the company's operations at Louisville, where Du Pont and B. F. Goodrich utilize the acetylene for neoprene and for vinyl monomers, respectively. Success of the National Carbide operation depends largely on the cheap and abundant Tennessee Valley power.

Canada Too: Other company facilities for making carbide are located at Ivanhoe, Va., and at Keokuk, Iowa. At the latter site is also the Midwest Carbide Corp., a joint venture of National Cylinder Gas Co. and Shawinigan Products Corporation. Shawinigan, as is well known, is the major producer in Canada, and has plans afoot to meet the demand for carbide in this country. One part of this expansion that is getting a checking-over is a possible plant at Pryor, Oklahoma where low power rates are an inducement.

Cyanamid Needs It: All these developments are primarily to make calcium carbide for acetylene chemicals as well as for welding and cutting uses. On the Canadian side of Niagara Falls, however, American Cyanamid Co. is pushing a carbide expansion to be readied by next spring for captive use. Among the company plans: more melamine, hydrogen cyanide, potassium cyanate, sulfa drugs, and "Picrite" (dicyanamid).

Economic Rivalry: But, except for the cyanamid expansion, most of the carbide is destined to make acetylene. Some active competition can be expected from the acetylene-via-natural gas process, now centered in the Gulf Coast area. Which of these routes is most economic depends on many factors. But in the long run, the users of acetylene will reap a juicy dividend.

New Sebacic Role?

Esters of sebacic acid, which have found wide application of plasticizers in plastics for low-temperature use, may be on the threshold of a new, large-scale market.

New use for esters of the acid may come as synthetic lubricants for use in the aircraft industry. Defense experts in Washington look on the temperature characteristics of sebacic esters as a possible answer to military

aircraft lubrication problems.

Main manufacturers of sebacic are Hardesty Chemical and Rohm & Haas, whose production each year probably totals about 16 million pounds. Biggest present use is in the manufacture of waterproof nylon, though plasticizers, various alkyd resins and synthetic greases aren't to be overlooked. The synthetic greases, while they were first developed in peacetime to be used in lubrication of farm machinery, may also ride a war boom.

An indication this week of the present increased sebacic production was the announcement by R&H of a reduction in the price of principal by-product capryl alcohol from 28½¢ per pound to 19½¢. The company termed its surplus of the alcohol "the greatest ever." Hardesty, on the other hand, has made no such announcement.

The present sebacic production would be roughly equivalent to 4 million gallons of synthetic lubricant—if all present production were used this way. Still, it's hardly a drop in the bucket compared to what production could be—if. The "if" is a big one, though, since no plans are certain, and manufacturers know that Washington, like a fickle female, has the prerogative of changing its mind.

Better than a ten-fold increase in production would be needed to supply the estimated potential lubricant needs of 40 million gallons. This, though, has been considered an inflated figure, since, as one company representative put it, "they know how to quote big figures."

Government Controls: At present, the only official Government finger in the sebacic acid pie is that of NPA's allocation branch. The chemical is under allocation under the M-45 order. With present use considered so important, as yet there has been no publicized Government encouragement of new plant capacity. No tax amortization writeoffs have been granted, and likely none will before the end of the moratorium.

On private expansion, since there are only two firms in the field, neither would be broadcasting any expansion plans. Undoubtedly though, if the Armed Forces give the go-ahead to sebacic lubricants, there would be definite incentive for construction with or without Government help.

The present ceiling on production is plant capacity; there is relatively little worry about raw materials—mainly castor oil. Such adjuncts to production as sulphuric harry manufacturers but don't significantly affect output. If a great increase in sebacic production is forthcoming, however, it's still a moot question whether the rise might not be limited by the availability of castor oil.

Price Picture: Sebacic price is tied closely to the market price of castor oil. As a result of the increase in prices of natural oils in the past months, sebacic is presently selling for 90¾¢ per pound. This is about double the pre-Korea price of 47¢. The present price, though, has been practically constant during the past seven months.

In any production picture, by-product sales are important. Here, both producers are looking for additional markets for capryl alcohol, cheapest of the 8-carbon alcohols. Although it is a secondary alcohol, its producers feels that for many uses it could replace other, more expensive isomers.

At present, it goes into some plasticizers, such as dicapryl phthalate and capryl 2-ethylhexyl phthalate. Here, though, the picture is muddied by the shortage of naphthalene and, as a result, of phthalic anhydride.

With a big expansion of sebacic capacity, some use could undoubtedly be found for capryl; but for the present at least, the search isn't ended.

GOVERNMENT NEEDS

Bid Closing | Invitation No. | Quantity | Item

CO Armed Services, Medical Procurement Agency, 84 Sands St., Brooklyn 1, New York:

September 6	113B	2592 btl	Mercury Bichloride
September 6	123B	35979 btl	Methanol
September 6	123B	5424 btl	Potassium Iodide
September 6	123B	58608 can	Sodium Bicarbonate
September 6	123B	60480 can	Sodium Chloride
September 6	123B	22560 btl	Zinc Oxide
September 6	123B	2232	Zinc Sulfate
September 10	132B	17448	Methyl Salicylate, 1 lb. USP
September 10	132B	1920 btl	Methylene Blue, 10-gm-NF certified biological
September 10	132B	1152 btl	Potassium Persulfate-¼ lb.
September 10	132B	1056 btl	Soap, surgical, liquid, 1 pt.
September 10	132B	1800 btl	Soap, surgical, liquid, 1 gal.

General Services Admn., Regional Information Officer, U.S. Court House, Chicago 4, Illinois

September 10	CH-34252	500 Gal	0-85 and Varnish

Chief, Procurement Division, Supply Service, Veterans Administration, Washington 25, D.C.:

September 4	A-13	864 bx	Aminophylline injection
September 4	A-13	384 bx	Calcium gluconate injection
September 4	A-13	1800 btl	Acetylsalicylic acid tablets
September 4	A-13	6048 btl	Ammonium chloride tablets

General Services Administration, 620 Post Office and Court House, Boston 9, Mass.:

September 5	(BO-W-1-17-52)	12 can	Pigment-in-oil, Cobalt blue—½ pint cans, Fed. spec. TT-P-381 and Amend 2
September 5	(BO-W-1-17-52)	12 can	Pigment-in-oil, Prussian blue—1¼ cans, Fed. spec. TT-P-381 & Amend 2
September 5	(BO-W-1-17-52)	24 can	Pigment, for paint, aluminum paste, type 11, class B, 1 lb. cans Fed spec. TT-A-468A
September 5	(BO-W-1-17-52)	64 can	Remover, paint, and varnish, type 11, 1-gal, containers, Fed. spec. TT-R-251A and Amend 2

Chicago Chemical Procurement District, Room 902, 226 W. Jackson Blvd.:

September 5	CML-11-021-52-6	73 Tons	Carbon tetrachloride, tech.

Commanding General, New York Quartermaster Procurement Agency, 111 E. 16th St., New York City:

September 17	52-110b	1 million lbs	Lime, chlorinated, 20 lb-export can

GOVERNMENT AWARDS

Item | Supplier | Location

Corps of Engineers, U.S. Army, North Atlantic Div., Philadelphia District, 121 N. Broad St., Phila., Pa.

Oxygen Generating Plant, Double Rectification	Superior Air Products Co.	Newark, N.J.

General Services Administration, Regional Information Office, Region 111, 7th & D Sts., S.W., Washington 25, D.C.

Paint, 1 gal. cans	Allied Paint & Color Works, Inc.	New York, N. Y.
Paint, 1 gal. cans	Long Island Paint & Chemical Co.	Glen Cove, N.Y.

Armed Services Medical Procurement Agency, 84 Sands Street, Brooklyn 1, N.Y.

Hydrocolloid, Alginates 33816 Type Impression	Coe Laboratories Inc.	Chicago, Ill.

Bureau of Ordnance, Washington 25, D.C.

Etayl Cellulose inhibiting tape for MK 31 Grains (2.75)	Joseph Davis Plastics Co.	Arlington, N.J.

General Services Administration, 1114 Commerce-Dallas, Texas.

Paint, Oil, Exterior, Ready Mixed	A. C. Horn Co. of Texas	Houston, Texas

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Microcrystalline Waxes 44B
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Flow Ratio Controller 44L
Incinerator 44M
Industrial Floors 44N
Laboratory Equipment 44I
Mixers and Stirrers 44J
Power System Equipment 44G
Steam Boiler Safety Equipment 44F
Ultra-Deionizer 44K
Wood-Tanks 44P

PRODUCTS ADVERTISED

For more data, circle number on coupon

Carbons, activated B26
Chemical technical service 46
Chemicals
- Di-t-butyl peroxide T26
- Caustic soda for soap manufacture I
- For electronic uses 25c
- Fine 22
- Fluorescent, M.D.A.C. T24
- Fluorides 8
- 8 Hydroxy quinoline benzoate T20a
- 8 Hydroxy quinoline citrate T20b
- 8 Hydroxy quinoline sulphate T20c
- Inorganic 25b
- Intermediates, inorganic 25a
- Metallic soaps 25d
- Monoesters, made-to-order 35
- Photographic 25f
- Polybutenes for:
  - Adhesives 21b
  - Electrical insulation 21c
  - Molded rubber specialties 21a
- Polyhydric alcohol fatty acid esters 36
- Potassium bichromate 27c
- Potassium hydroxide pellets 17a
- Reagents, analytical 25e
- Reagents and fine chemicals 45
- Resinous plasticizer-extender for polyvinyl acetates 1
- Sodium bichromate 27a
- Sodium chromate 27b
- Sodium hydroxide pellets 17b
- Sodium sulphate 27d

Consulting service B20
Containers
- Cans, with positive reclosure 7
- Shipping sacks, multi-wall paper 2

Control instruments 3b
Filters, precoat 4
Shakers, sieve, testing 31
Spectrometers 3a
Sulphur 28
Waxes
- Carnauba 18
- Microcrystalline 32

SEARCHLIGHT SECTION

(Classified Advertising)

PROFESSIONAL SERVICES 41

EMPLOYMENT

Position Wanted 42

ADVERTISERS INDEX

Chemical Service Corp. 42
Consolidated Products Co., Inc. 42
First Machinery Corp. 42
General Container Corp. 42
Perry Equipment Co. 42
Tobey Chemical Co. 42
Truland Chemical & Engineering Co., Inc. 42

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POSITION _____

COMPANY _____

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CITY & STATE _____

Editorial Items

24A 26A 26B 44A 44B 44C 44D 44E 44F 44G 44H 44I 44J 44K 44L 44M 44N 44O 44P

Advertisements

1 1 2 3a 3b 4 7 8 17a 17b 18 T20a T20b T20c B20 21a 21b 21c 22 T24 25a 25b 25c 25d 25e 25f T26 B26 27a 27b 27c 27d 28 31 32 35 36 45 46

Expires December 1, 1951

BOOKLETS . . . .

Chemicals

Molding Powders

Technical booklet devoted to "Hercocels," cellulosic materials finding application in such varied fields as housewares, toys, tools, safety equipment, etc. Data is given for both Hercocel A, a cellulose acetate molding powder and Hercocel E, an ethyl cellulose molding powder. Hercules Powder Co.

Microcrystalline Waxes

10-p. booklet outlining the properties, specifications, compatibility and solubility data for microcrystalline waxes, high-molecular-weight branched chain products used in such fields as polishes, packaging, paper manufacturing, printing and ink manufacture and for electrical and other industrial uses. Petrolite Corp., Ltd.

Mechanical Foam

4-p. bulletin dealing with liquid type mechanical foam for extinguishing polar solvent or petroleum products fire. National Foam System, Inc.

Feeds and Food Products

4-p. bulletin listing prices of firm's services in the analyses, testing, research and development of feeds and food products. Raymond C. Crippen Research & Development Laboratories.

Equipment

Belt Conveyor Idlers

41-p. bulletin giving information on the latest designs and developments in belt conveyor idlers and machinery, including several pages of general engineering information plus data on lubrication material and techniques; new models are described. Chain Belt Co.

Steam Boiler Safety Equipment

20-p. supplemental catalog covering safety devices for steam and hot water boilers; described, diagrammed and illustrated are boiler water feeders, make-up water feeders for receivers, float operated switches, solvent still regulators, etc. McDonnell & Miller, Inc.

Power System Equipment

16-p. illustrated bulletin dealing with power system equipment for pulp and paper mills, featuring a discussion on types of turbine generators and recommendations for making a selection; also presented is power generation and power distribution equipment designed for specific mill needs. General Electric Co.

Compensated Thermal Anemometer

10-p. AIEE paper entitled, "A Compensated Thermal Anemometer and Flowmeter," by Charles E. Hastings and Chester R. Wcislo, is concerned with thermal anemometers which operate by placing heated thermopiles in the airstream; topics covered include the principle of operation, probe design, fluctuation response, calibration, applications and conclusion. Hastings Instrument Co., Inc.

Laboratory Equipment

13th edition of firm's booklet, "What's New for the Laboratory," describes operating principles and uses of flame photometry attachment, electronic temperature controller, constant temperature water bath, aluminum speed desiccators, etc. Scientific Glass Apparatus Co.

Mixers and Stirrers

6-p. folder describing industrial mixers, designed to be clamped to open head drums, barrels or tanks while mixing fluids, suspensions, slurries and emulsions and also covering laboratory stirrers, including the air-driven explosion proof types. Grenier & Co., Inc.

Ultra-Deionizer

6-p. folder and data sheet dealing with single tank deionizers of mixed-bed monoflo design for the removing of ionizable impurities—including carbon dioxide and silica. Elgin Softener Corp.

Flow Ratio Controller

Bulletin explaining the component features and operating principle of Ratomatic flow ratio controllers, complete systems for proportioning the flow of fluids—gases, slurries, liquids—in two or more lines. A list of typical applications is included. Fischer & Porter Co.

Incinerator

16-p. catalog on industrial and institutional incinerators covers both inner and outer construction features and describes the various types used for disposing of dry waste, garbage and wet refuse, biological and pathological materials and wood refuse. Plibrico Jointless Firebrick Co.

Industrial Floors

12-p. bulletin entitled, "Why Engineer an Industrial Floor," explains how a floor engineered and designed to certain specifications can resist such destructive conditions as extremes of temperature, oils, greases, chemical and industrial wastes, moving loads and deadweight and shock and vibration. Flash-Stone Co., Inc.

Centrifugal Pump

4-p. bulletin containing specifications, dimensions and selection chart for type "G" pump designed for process industries and chemical plants having semi-critical requirements. Warren Steam Pump Co., Inc.

Wood-Tanks

26-p. catalog, "Wood Tank Engineering," furnishing information on wood tank erection, maintenance, and installations; selection tables and charts list sizes and species of lumber. Arrow Tank Co.

ADVERTISER'S INDEX

AMERICAN CAN CO. 7
Agency—Young & Rubicam, Inc.

AMERICAN POLYMER CORP. 1
Agency—Bennett, Walther & Menadier, Inc.

BAKER & ADAMSON PRODUCTS, GENERAL CHEMICAL DIVISION, ALLIED CHEMICAL & DYE CORP. . . . . 3rd Cover
Agency—Atherton & Currier, Inc.

BAKER CHEMICAL CO., J. T. 17
Agency—Wildrick & Miller, Inc.

BARECO OIL CO. 32
Agency—White Advertising Agency

CARLISLE CHEMICAL WORKS, INC. T24

CHEMICAL SOLVENTS, INC. 41

EDWAL LABORATORIES, INC. 22
Agency—Hamilton Advertising Agency, Inc.

EIMCO CORP., THE 4
Agency—Matsie Company

DISTILLATION PRODUCTS INDUSTRIES, DIVISION OF EASTMAN KODAK CO. 35
Agency—The Griswold Eshleman Co.

FISHER CHEMICAL CO., INC. T20
Agency—Freiwald & Coleman Advertising

GLYCO PRODUCTS CO., INC. 36
Agency—J. Hayden Twiss, Advertising

GREEFF & CO., INC., R. W. B26
Agency—J. Hayden Twiss, Advertising

HARSHAW CHEMICAL CO., THE 8

INNIS, SPEIDEN & CO., INC. 18
Agency—J. Hayden Twiss, Advertising

LUCIDOL DIVISION, NOVADEL AGENE CORP. T26
Agency—Landsheft, Inc.

MALLINCKRODT CHEMICAL WORKS 25
Agency—The Philip Ritter Co.

MANN & CO., INC., GEORGE 41

MATHIESON CHEMICAL CORP. . . . . 2nd Cover
Agency—Doyle, Kitchen & McCormick, Inc.

McGRAW-HILL BOOK CO. 30, 33

NATURAL PRODUCTS REFINING CO. 27
Agency—Michel Cather, Inc.

NEWARK WIRE CLOTH CO. 31
Agency—Sanger-Funnell, Inc.

ORONITE CHEMICAL CO. 21
Agency—L. C. Cole Co.

PERKIN-ELMER CORP., THE 3
Agency—Fred Wittner Advertising

RAYMOND BAG CO. 2
Agency—H. T. Shephard Agency

SAUEREISEN CEMENTS CO. 41

SNELL INC., FOSTER D. B20
Agency—Ray Hawley, Advertising

TEXAS GULF SULPHUR CO., INC. 28
Agency—Sanger-Funnell, Inc.

WITCO CHEMICAL CO. . . . . Back Cover
Agency—Hazard Advertising Co.

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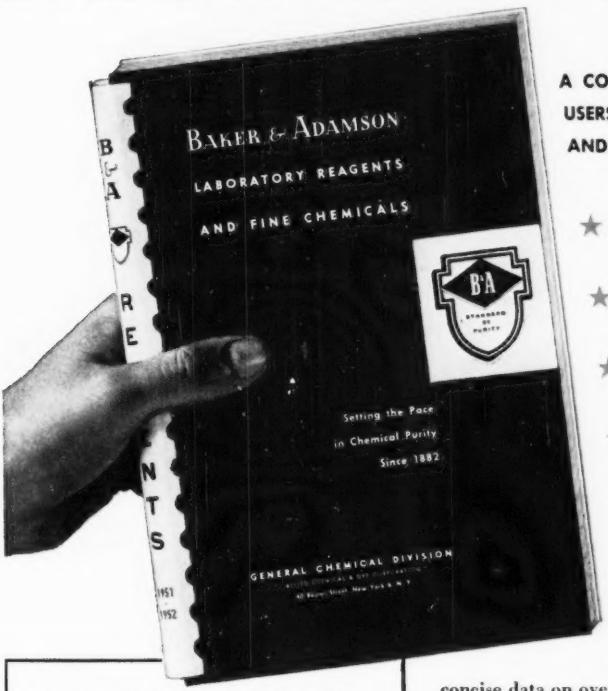

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